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كلية الدراسات العليا

التاريـــخ: / /

نموذج رقم (١٨)
اقرار والتزام بالمعايير الأخلاقية والأمانة العلمية
وقوانين الجامعة الأردنية وأنظمتها وتعليماتها
لطلبة الماجستير

أنا الطالب: أحمد مزحات [illegible] الرقم الجامعي: (٨٠٨٠٣٠٠)
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عنوان الرسالة: Evaluation of the Competitiveness of Dairy Agribusiness Sector in Jordan

اعلن بأنني قد التزمت بقوانين الجامعة الأردنية وأنظمتها وتعليماتها وقراراتها السارية المفعول المتعلقة باعداد رسائل الماجستير عندما قمت شخصيا" باعداد رسالتي وذلك بما ينسجم مع الأمانة العلمية وكافة المعايير الأخلاقية المتعارف عليها في كتابة الرسائل العلمية. كما أنني أعلن بأن رسالتي هذه غير منقولة أو مستلة من رسائل أو كتب أو أبحاث أو أي منشورات علمية تم نشرها أو تخزينها في أي وسيلة اعلامية، وتأسيسا" على ما تقدم فانني أتحمل المسؤولية بأنواعها كافة فيما لو تبين غير ذلك بما فيه حق مجلس العمداء في الجامعة الأردنية بالغاء قرار منحي الدرجة العلمية التي حصلت عليها وسحب شهادة التخرج مني بعد صدورها دون أن يكون لي أي حق في التظلم أو الاعتراض أو الطعن بأي صورة كانت في القرار الصادر عن مجلس العمداء بهذا الصدد.

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EVALUATION OF THE COMPETITIVENESS OF DAIRY AGRIBUSINESS SECTOR IN JORDAN

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COMMITTEE DECISION

This Thesis (Evaluation of the Competitiveness of Dairy Agribusiness Sector in Jordan) was successfully defended and approved on April 24, 2011

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To …

My Mother's Soul

To …

My Father

To …

My Siblings

Noor, Tareq & Ruba

To …

My Lovely Nephews

Talal & Nabil

Thank you all …

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List of Abbreviations

ACI	Amman Chamber of Industry
CIF	Cost, Insurance and Fight
CMS	Constant Market Share
DOS	Department of Statistics
EU	Europe Union
FAOSTAT	Food and Agriculture Organization Statistical Database
FOB	Free on Board
GDP	Gross Domestic Product
HACCP	Hazard Analysis Critical Control Point
ISO	International Standard Organization
JD	Jordanian Dinar
JIB	Jordan Investment Board
JV	Jordan Valley
MENA	Middle East North African Countries
MIT	Ministry of Industry and Trade
MOA	Ministry of Agriculture
R&D	Research and Development
RCA	Revealed Comparative Advantage
RMP	Relative Import Penetration
RTA	Relative Trade Advantage
RXA	Relative Export Advantage
UAE	United Arab Emirates
USA	United States of America

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ABSTRACT

This study concentrates on evaluating the competitiveness of the dairy sector in Jordan, by achieving the following objectives: to show the production situation and competitiveness of dairy industry, to identify the main factors affecting the dairy sector, to study the ability of the dairy sector products to reach the international markets, and to determine the relative priorities of enterprises and their perceived need for support. To achieve these objectives, two methods were used. The first one is Porter's Diamond Model, which studied the competitiveness of the dairy sector in Jordan. The second method was Revealed Comparative Advantage (RCA) indicator with its two criteria Balassa and Vollrath, which shows if dairy sector in Jordan has a comparative advantage against some MENA countries.

The findings of this study showed that the whole cow milk cheese production in Jordan has a comparative advantage and has good competitive advantage against Kuwait, Morocco, UAE and Yemen, and there was no comparative advantage against Egypt and Lebanon. Porter's diamond model showed that large and medium processing plants have big potentials to compete with the international markets, but there are some problems in the input, regulation and governments routines, and export procedures that stand as a barrier facing the competition with other countries.

The study recommended to the government to encourage the establishment of a market information center/authority, to focus on high-quality training and practical advice to farmers and dairy producers, and provide some support on forages. For dairy processing plants the study recommended that they have to concentrate on the exports to the countries that Jordan has a high RCA compared to competing countries, and it recommended to the medium processing dairy plants to apply the satellite plants to include the small processing dairy plants in their activities.

Chapter 1

Preface

1-1 Introduction

The agricultural sector in Jordan has an important role in the development of the industrial sector. It contributed about 3.1% of the Jordan's GDP in 2009, but it actually contributed with more than this percentage if the agribusiness aspects were taken into account. These aspects include the agricultural input sector, packaging sector, transportation sector and the processing sector which, in turn, increases the agricultural sector contribution of Jordan's GDP. The food industry is the largest manufacturing sector in Jordan, and it depends on the agricultural production in its raw materials, which give other importance to the agricultural sector in Jordan. (DOS, 2009)

The agricultural sector in Jordan is divided into two main sectors: plant production sector and animal production sector.

The animal production sector is divided into three subsectors. The first one is the livestock sector which consists of three parts: cattle, sheep, and goats. The second one is the poultry sector which consists of two parts: broilers and layers. The third one is the aquaculture and bee sector. (MOA, 2009)

This study concentrates on the livestock sector of the animal production sector. The total number of livestock in 2009 reached 3,055,190 heads, cattle, sheep and goats contributing 2.1%, 67.8% and 30.1% respectively to the livestock sector. (DOS, 2009)

This study took the cattle subsector into consideration because it's the main source of raw milk supplying the dairy factories in Jordan.

Jordan Industry is divided into two main categories. The first sector is the manufacturing (processing) sector which contributes 18% of the Jordanian gross domestic product (GDP). The second sector is the mining sector which contributes 2% of Jordanian GDP. The food industry is one of the most important sections of the

processing sector in Jordan, and it includes the dairy sector which is also one of the most important sections of the food industry sector. (MIT, 2008)

The gross output for the food industries was 1,184,095 tons in 2008, and it contributes with 27.8% of the manufacturing sector gross output. Dairy industry is considered as one of the most important sectors of the food industry. It contributes with 9.7% of the food industry gross output. (DOS 2008)

1-2 Background

The dairy cattle sector in Jordan is regarded as one of the most important component in the livestock sector it is the main source of the production of fresh raw milk. (MOA, 2009)

An increasing in the volume of investment has been noted in dairy cattle-breeding, which witnessed a quantum leap from family farms and small farms to large commercial farms with hundreds of heads of imported and specialized dairy cows in the production of milk. Besides, there are some farms using computerized systems in farm management in terms of managing automatic milking machines as well as nutrition and provision of fodder to achieve economic targets established for these farms.

The total number of dairy cattle in Jordan reached 68,781 heads in 2009, distributed between Dutch cattle and local and hybrid cattle. The total Dutch cattle reached 63,346 heads, which constitutes about 92.1% of total cattle in Jordan. As for the local cattle, the total number reached 5,435 heads, which constitutes about 7.9 % of total cattle in Jordan. Dairy cows constitute about 69% of the total number of cattle (47,320 heads); 44,153 heads are Dutch Dairy cows, and the rest are local/hybrid cows. (Table 1) (MOA, 2009)

Table 1: Number of Dairy Cattle in Jordan (Heads)

Strain	Dairy Cows	Female Calves	Male Calves	Bulls	Total
Local	3159	1687	540	49	5435
Dutch	44153	14245	4587	361	63346
Total	47320	15932	5127	410	68781

Source: Ministry of Agriculture. Department of Dairy Production. Annual report. Jordan, 2009

The number of dairy cows farms reached 788 farms in 2009, distributed unevenly among the various governorates of the Kingdom, and the number of licensed and unlicensed farms reached 594 and 194 respectively. (MOA, 2009)

It was noticed that the dairy cattle farms are concentrated in some governorates, because of the high density of population there and the demand are high in these governorates, this will guarantee that the dairy products will not get spoiled. The rest of the governorates were depending on the family raising dairy cattle's farms. The highest concentration of dairy cows farms was in Balqa, Irbid, Amman, Zarqa, and Mafraq respectively. (Table 2)

Table 2: Dairy Cows Farms in Jordan

Governorate	Total Number of Dairy Cow Farms	Total Number of Cows	Average Number of Cows Per Farm
Balqa	249	2364	9
Irbid	245	5935	24
Amman	80	7241	91
Zarqa	65	19731	304
Mafraq	64	13246	207
Madaba	34	1154	34
Ajloun	27	312	12
Kerak	12	96	8
Jerash	8	221	28
Tafilah	1	27	27
Ma'an	1	52	52
Aqaba	0	0	0
Total	788	50379	

Source: Ministry of Agriculture. Department of Dairy Production. Annual report. Jordan, 2009

Total Production of milk reached 358,423 tons in 2009. The milk produced from the dairy cattle sector was 255,247 tons, which contribute with 71.2% of the total milk produced in Jordan. The milk production increased in 2009 by 38,114 tons as compared to 2008, and the increase was mostly from the dairy cattle sector; due to the increase of the demand of the dairy products in Jordan. (MOA, 2009)

Due to the increase in population and the demand on dairy products, the production of milk and the manufactured milk did not meet the needs of the kingdom people. So it was imperative to import dairy products from different countries to fill the gap. The quantity imported of dairy products reached 243,204 tons in 2009, and the percentage of self-sufficiency of milk reached at 60% in that year, while it was 63% in 2008 year consumption; the average per capita of milk and its derivates reached 92 kilograms per year in 2009, while it was 84 kilograms in year 2008. The average consumption per capita in 2009 has increased by 8 Kg/Capita/Year as compared to 2008. Even though the milk production increased in 2009, the needs of the Kingdom were still not met. To fill the gap, the imports increased in 2009. (MOA, 2009)

As for forages, alfalfa is considered as the main forage in Jordan, but it is planted in limited areas, where the planted area of alfalfa is in Jordan was 47.7 thousand dunums and produced 265.6 thousand tons in 2009. For Barley and corns the estimated production were around 31.8 thousand and 30.8 thousand tons respectively, the production vary from one year to another due to the difference in the average rainfall. Dry forages are the residues of crop plants, mainly straw, the amount produced was about 45 thousand tons in 2009. (MOA, 2009)

Jordan depends heavily on importing the forages to cover its needs. In 2009 Jordan imported around 14,673 thousand tons of forages. The total need of dairy cattle of forages in 2009 was 69 thousand tons.

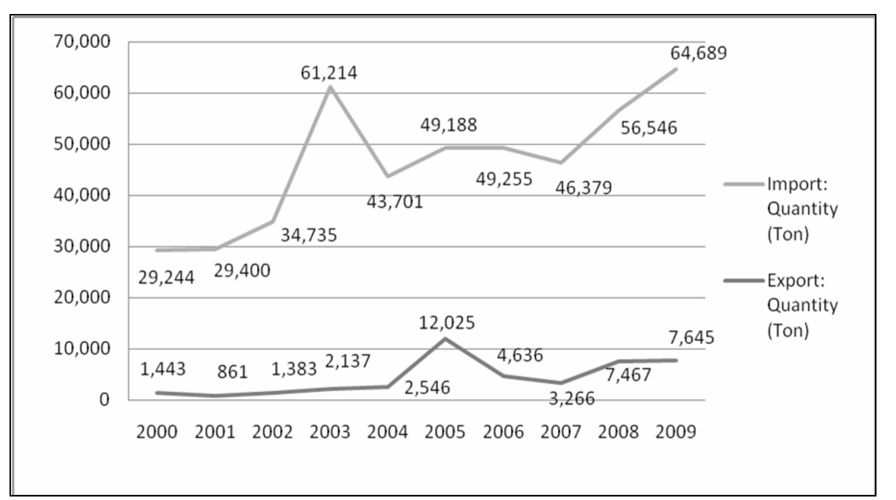
Table (3) shows that the value and quantity of imported and exported dairy products from 2000 to 2009. The value and quantity of the imported dairy products are higher than the exported dairy products. In 2008 and 2009 the value of imported dairy products increased significantly, due to the economic and financial crisis that occurred in 2008, it affected the prices of the many sectors including the dairy sector.

Table 3: External Trade for Jordanian Dairy Products

Year	Import: Value C.I.F. in J.D.	Import: Quantity (Ton)	Export: Value F.O.B. in J.D.	Export: Quantity (Ton)
2000	47,422,732	29,244	2,286,759	1,443
2001	48,067,846	29,400	1,079,319	861
2002	51,487,533	34,735	2,363,375	1,383
2003	76,899,957	61,214	3,702,498	2,137
2004	66,737,974	43,701	5,227,221	2,546
2005	86,308,308	49,188	26,295,951	12,025
2006	87,345,635	49,255	8,892,423	4,636
2007	93,903,459	46,379	6,385,240	3,266
2008	162,445,865	56,546	14,013,764	7,467
2009	146,120,798	64,689	13,515,223	7,645

Source: Department of Statistics, Economic, Economic statistics, External Trade, Yearly, 2009

Figure (1) shows quantities of imported and exported dairy products trend from 2000 to 2009. In 2003 the quantity of imported dairy products increased significantly, due to second war in Iraq, many Iraqis citizens moved to Jordan. It then decreased and started to increase normally to reach the maximum quantity in 2009. The exports of dairy products in 2005 reached its maximum. After that, it decreased and then slightly increased.



Source: Department of Statistics, Economic, Economic statistics, External Trade, Yearly, 2009

Figure 1: Import and Export Trend for Dairy Products in Jordan

The dairy sector in Jordan is one of the oldest industries in Jordan, it witnessed a big leap of evolution and it has been developed in an accelerating form. During the early 1970's, Jordan established programs to promote dairy farming. Farmers improved dairy cattle, complying with top industry operating standards and introducing the latest technology in processing, packaging and distribution. A new kind of dairy products are produced rather the traditional known products after entering to the dairy sector new technologies in processing the milk. Jordan experienced a noticeable growth in milk production and consumption during the last two decades. Milk production was growing by 5.4% from 2002 to 2007. (DOS, 2009)

The dairy sector could be divided into three categories: large, medium and small processing plants. Large processing plants have their own dairy cow farms and fodder farms, some of the large processing plants own retail shops selling their own dairy products. For medium processing plants they produce dairy products and sell them to other retailers. The small processing plants produce their dairy products and sell them in their own shops.

1-3 Justification

Competitiveness is defined as the ability of the nation's firms to achieve sustained success versus foreign competitors without protection or subsidies. Overall profitability of nation's firms in the industrial sector is the trade balance in the industry, and direct measures of cost and quality of industrial level. (Porter, M.E. 1998)

Competitiveness is vital if a nation's firms are to guard against the threats posed by the international economy. International competition has become fiercer than ever before. Lower costs of transportation and communication, reduced trade barriers and the spread of technology have fused to sharpen international competition. Indeed, this competition has put an unprecedented pressure on all national economic factors, including management, labor and government. In the environment in which the nation's firms must continually be improved in order to encounter the threat from an ever-widening array of competitors, the failure of management, labor, or government to face the challenge which can spell out disaster for the nation's firms.

A nation's standards of living are increasingly dependent on the competitiveness of its firms. Competitiveness is vital if the nation's firms are to get the advantage of the opportunities opened up in the international arena. The world trade and the foreign investment have grown faster than the world output in the last several decades.

Competitiveness in industries subjected to the international trade and the foreign direct investment can therefore provide substantial leverage for economic growth. This is especially true for small nations, where competitiveness can allow firms to overcome the limitations of their small home markets in order to achieve their maximum potential.

Jordan's foreign trade policy is based on the norms of economic openness and integration into the rapidly globalizing world economy. It incorporates the country's vision and possessiveness in viewing economic partnerships to achieve both mutual

interests and fair dividends. Jordan has made giant strides in its economy and trade liberalization in addition to reinforcing mechanisms and functioning of a market-oriented economy that is built on an active role of the private sector in managing economic activities. This was made possible through an intensive reform process bringing about a modern and conducive regulatory environment for both business and investment.

1-4 Study Problem and Objectives

1-4-1 Study Problem

The world's economy has entered an era of total competition. Traditional barriers have begun to fall. New sophisticated competitors have emerged, and global rivalry has increased. Therefore, this study concentrates on evaluating the competitiveness of the dairy sector, by implementing Porter's Diamond Model and evaluating the Revealed Competitive Advantage indicators.

The Questions of this study are:

1. What are the production situation and competitiveness of dairy industry?
2. What are the main factors affecting the whole industry?
3. Are the dairy industry products able to reach the international market?
4. What are the right indicators that can be used to evaluate the national competitiveness with respect to MENA countries?

1-4-2 Study Objectives

The main objective of this study is to evaluate the competitiveness of dairy industry.

The specific objectives of this study are the following:

1- To identify the main factors affecting the whole industry for dairy sector.

2- To study the ability of the dairy sector products to reach the international markets.

3- To identify the relative priorities of enterprises and their perceived need for support.

1-5 Contents

This study consists of five chapters. Chapter one includes the introduction, background of the dairy cows sector, study problem objectives and contents. Chapter two is entitled "literature review" which describes the three major related fields: status of milk and dairy sector in Jordan, Porter's Diamond Model, and Revealed Comparative Advantage.

Chapter three contains the methodology used, which includes the data collection section, study area, sampling, and data analysis, which includes the descriptive analysis, Porter's Diamond Model, and Revealed Comparative Advantage.

Chapter four is entitled "results and discussion"; it consists of three major domains. The first is entitled dairy sector agents. The second is entitled Porter's Diamond Model application. The third is entitled Revealed Comparative Advantage.

Chapter five includes the conclusion recommendations; it talks about important points and subsequence recommendations.

Chapter 2

Literature Review

2-1 The Status of the Milk and Dairy Sector in Jordan

The development of the Jordanian Dairy sector and the milk production development in Jordan were studied by AlQaisi, Ndambi and Hemme (2009). The objective of their study was to show the recent developments in milk production in Jordan, and it attempts to understand the drivers for the development in the milk production. The Study found that the dairy sector in Jordan has encountered several problems in feeding and management; there is an absence of a clear farm gate pricing strategy, unbalanced feed rations and scarcity of feed resources. Also, milk production cost is high due to the high feed prices. It recommended that the dairy sector should have clear strategies in milk pricing, which should be associated with feed prices. Moreover, reducing imports of powdered milk will greatly help farmers market their milk. Finally, an improvement on feed rations and the use of high quality roughages and silage should be encouraged.

The difference between their study and this study is that this study will evaluate the competitiveness of the dairy sector in Jordan and reach the international market while their study investigated the development in the milk production.

Jordan dairy sector market structure was studied by Mohsen (2001), who investigated the economic performance of dairy firms in Jordan through analyzing their economic structure, vertical relations (conduct) and consequently performance. The objectives of the study were: 1) to acquire the needed knowledge for dairy industry, its bottlenecks and horizons, 2) to measure the degree of vertical integration as a major indicator to reveal the developed economic relations and their orientations in order to possess the ability to understand the effect on the economic structure on the community's welfare, 3) to analyze the correlation between vertical integration and the level of monopoly power, 4) to analyze the correlation between the degree of vertical

integration and economic performance, and 5) to investigate the vertical integration motivations and their impact on investment in this industrial sector. The results of the study were; Dairy Industry Growth Rates, Concentration Ratio as an Indicator of Monopoly Power, Vertical integration index, Herfindahl Hirschman Index and Profitability indicator (PI) were computed using different measures. The dairy firms sample total capital was JD 5.4 million, the largest four firms total capital was JD 5.1 million; their percentage of capital was 94.4% the market concentration would be considered high. The sample total sales was about JD 36.5 million, the largest four firms profits was JD 28.3 million ; their percentage of profits concentration was 77.6%. The correlation between the capital and total revenue (0.74), capital and total costs (0.795) were significant, the higher significant correlation coefficient was found between the capital paid and number of employees (0.9). The concentration ratio as a measure of monopoly, was found to be highly correlated with the total sale, capital paid, total merchandises, other expenses, employment and profit. This means that the high barrier to entry was enabling the firms to act monopolistically. Most of the variable costs of dairy processing firm were raw materials (raw milk), while other expenses were very low in value, but still highly correlated with total sales, added value and capital. Mohsen (2001) concentrated on evaluation of the structure, conduct and performance of the dairy sector in Jordan, while the current study will concentrate on evaluating the competitiveness of the dairy sector in Jordan, and it will use different methodologies as compared to the previous study.

2-2 Porter's Diamond Model

The Jordan National Competitiveness Team (2009), who conducted a study about the national processed meat sector analysis in Jordan by using Michael Porter's Diamond Model, measured the competitiveness of this sector in Jordan and examined if

a competitive advantage exists and how it can be improved. Furthermore, in order to conduct gap analysis, a benchmarking analysis was used. The difference between the previous study and this one is the evaluation of the sector; they evaluated the processed meat sector competitiveness while this study is concentrating on the dairy sector

Porter's Diamond Model and the main objective of the study were also discussed by Karacsony (2008), the study used "Porter's diamond model" to explore the competitiveness of Hungarian wheat sector. The aim of the study was to show the production situation and competitiveness of wheat, one of the most important produce of the plant growing branch of the Hungarian agricultural economy. The Similarity between Karacsony (2008) and this study is that both studies have the same main objective and used Porter's Diamond Model, whereas the difference in between is that this study is concerning with evaluating the Dairy Sector competitiveness in Jordan.

Porter's Diamond Model, Revealed Comparative Advantage, and a cluster map are used in this study and by the Jordan National Competitiveness Team (2000) study; their study was about agriculture in Jordan Valley.

2-3 Revealed Comparative Advantage (RCA)

The Revealed Comparative Advantage is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows.

Balassa Revealed Comparative Advantage indicator, one of the specific objectives were studied by Poramacon (2002), (RCA) and the Constant Market Share Model (CMS) techniques were applied to natural rubber in Thailand as compared to Indonesian natural rubber by using 1991-1998 data. The reason for using this study was to evaluate the Revealed Comparative Advantage (RCA) indicator which will be used here.

Another RCA (Vollrath Revealed Comparative Advantage) is used in this study as discussed by Ferto and Hubbard (2002). Their study investigated the competitiveness of Hungarian agriculture in relation to that of the EU employing four indices RCA, RXA, RMP, and RTA, for the period 1992 to 1998.

Chapter 3

Methodology of the Study

3-1 Data Collection

3-1-1 Primary Data

Representative data samples were collected from the following market agents:

A. Dairy Cows Farms

There were 788 dairy cows' farms in Jordan in 2009, a questionnaire was prepared for the farms and it concentrates on inputs, costs, production and milk distribution. Table (4) shows the dairy cow farms in Jordan in 2009.

Table 4: Farm Milk Producers and there Distribution in Jordan

The Governorate	The Total Number of Dairy Cow Farms	The Total Number of Cows	The Average Number of Cows Per Farm
Balqa	249	2364	9
Irbid	245	5935	24
Amman	80	7241	91
Zarqa	65	19731	304
Mafraq	64	13246	207
Madaba	34	1154	34
Ajloun	27	312	12
Kerak	12	96	8
Jerash	8	221	28
Tafilah	1	27	27
Ma'an	1	52	52
Aqaba	0	0	0
Total	788	50379	

The farms sample is chosen according to the farms size; the farms were divided into four categories in which each category shares similar patterns as shown in table (5).

Table 5: Dairy Cows Farms Categories

Category	Range (Number of Cows)	Number of Farms
Very Large (A)	≥ 500	18
Large (B)	300 – 499	40
Medium (C)	100-299	70
Small (D)	16-99	660
Total		788

B. Dairy Processing Plants

There were 210 dairy processing plants all over the country in 2009. A representative sample was chosen from the dairy processing plants and a questionnaire was prepared to collect data and information from them. The main important indicators discussed in this questionnaire are the main factors of Porter's Diamond Model which are: Factor conditions, Demand conditions, Related and Supporting industries and Firm Strategy, Structure and Rivalry, and other outer factors such as the Government and Chance. Table (6) shows the numbers of processing plants depending on their sizes, the processing plants size classified according to their capital.

Table 6: Dairy Processing Plants Classification

The Plants Size	The Range in JD	The Number of Plants
Large Plants	≥ 750,000	14
Medium Plants	100,000 – 749,000	66
Small Plants	1,000 – 99,000	130
Total		210

C. Retailers

Retailers are divided into specialized dairy retailers and non-specialized retailers. A sample for specialized dairy retailers was taken from all over the country, and a questionnaire was prepared for these retailers. It concentrates on the source of the product, the distribution and demand on dairy products.

Also a sample of non-specialized retailers was taken such as mini-markets, supermarkets and grocery stores in Amman.

D. Importers

There are 127 dairy importers; a questionnaire was prepared for a sample from these importers for every sub-sector. The questionnaire asked for general information about the importers, from where they import, to whom they distribute, and the quantity imported.

3-1-2 Secondary Data

The secondary data included: the academic researches reports , the Ministry of Agriculture (MOA), the Ministry of Industry and Trade (MIT), Amman Chamber of Industry (ACI), Department of Statistics (DOS), Jordan Customs, FAOSTAT, General Food Stuff Association, and PhD and M.Sc Thesis. General information was taken from these resources about the dairy sector in Jordan and the methodology used in this study.

3-1-3 Data Sampling

A sample was taken from several agents, as shown in the next part.

A. Dairy Cows Farms

The required sample size was found to be 90 farms at confidence level of 95%, using the following formula:

$$n = \frac{Z^2 * \sigma^2}{(\chi - \mu)^2}$$ (Glenn, 1992)

Where,

n: sample size

Z: degree of freedom at 95% confidence level (1.96)

σ: standard deviation of the population (220)

χ: sample means (250)

μ: population means (204)

The sample size was 90 dairy cow farms, and was divided into categories as shown in table (7).

Table 7: Dairy Cows Farms Sample for Each Category

Category	Number of Farms	Percent (%)
A	9	10.0
B	12	13.3
C	18	20.0
D	51	56.7
Total	90	100

B. Dairy Processing Plants

The required sample size represents 30% of the community size (63 processing plant) in order to ensure normal distribution and homogeneity in the sample, where 30% of the community size rises to the level of society. However, the study met 50 processing plants who filled the questionnaire. Systematic random sample was used as a method of sample selection for each category as shown in table (8).

Table 8: Dairy Processing Plants Sample for Each Category

Category	Number of Plants	Percent (%)
Large Plants	7	14.0
Medium Plants	18	36.0
Small Plants	25	50.0
Total	50	100.0

C. Retailers

The retailers were divided into two parts. The first one is the specialized retailers. There is no published list for specialized retailers and where they are concentrated. The sample was taken from specialized retailers dealing with the farms and processing plants in the other samples. The size of specialized retailers sample reached 80 shops, as shown in table (9).

Table 9: Specialized Retailers Sample

The Governorate	Number of Specialized Retailers	Percent (%)
Amman	25	31.2
Irbid	21	26.2
Jerash	14	17.5
Ajloun	9	11.2
Zarqa	11	13.8
Total	80	100.0

The second part of the retailers is the non-specialized ones. This part was divided into three categories: minimarkets, supermarkets, and grocery stores in Amman. The number of non-specialized retailers is large. Therefore, the selected size of the sample was 70 non-specialized retailers in different locations in Amman as shown in table (10).

Table 10: Non-Specialized Retailers Sample

The Category	The Number of Stores	Percent (%)
Grocery Stores	5	7.1
Supermarkets	39	55.7
Mini-Markets	26	37.1
Total	70	100.0

D. Importers

The study met 11 importers who filled the questionnaire.

3-2 Analytical Approach

3-2-1 Porter's Diamond Model

The essence of Porter's Diamond Model is that the competitive advantage of a country is made possible by the four correlated makings of the local economic environment. The four factors are: factor conditions, demand conditions, related and supporting industries, as well as the firm strategy, structure and rivalry. Two outer

factors also belong to the diamond model: the roles of the government and the chance. (Porter, M.E. (1990))

Factor conditions are human resources, physical resources, knowledge resources, capital resources and infrastructure. Factor conditions can be seen as advantageous factors found within a country that are subsequently built upon by companies for more advanced factors of competition. Specialized resources are often specific for the industry and important for its competitiveness. Specific resources can be created to compensate for factor disadvantages such as workforce shortage and can also be seen as companies' focus on automation and zero defects. (Porter, M.E. (1990))

Demand conditions are the nature of home-market demand for the industry's product or service, in the home market can help companies create competitive advantage. If the local market for a product is larger and more demanding at home than that in foreign markets, local firms potentially put more emphasis on improvement than that of foreign companies. This will potentially increase the global competitiveness of local exporting companies. A more demanding home market can thus be seen as a driver of growth, innovation and quality improvements. For instance, Japanese consumers have historically been more demanding of electrical and electronic equipment than western consumers. This has partly founded the success of Japanese manufacturers within this sector. (Porter, M.E. (1990))

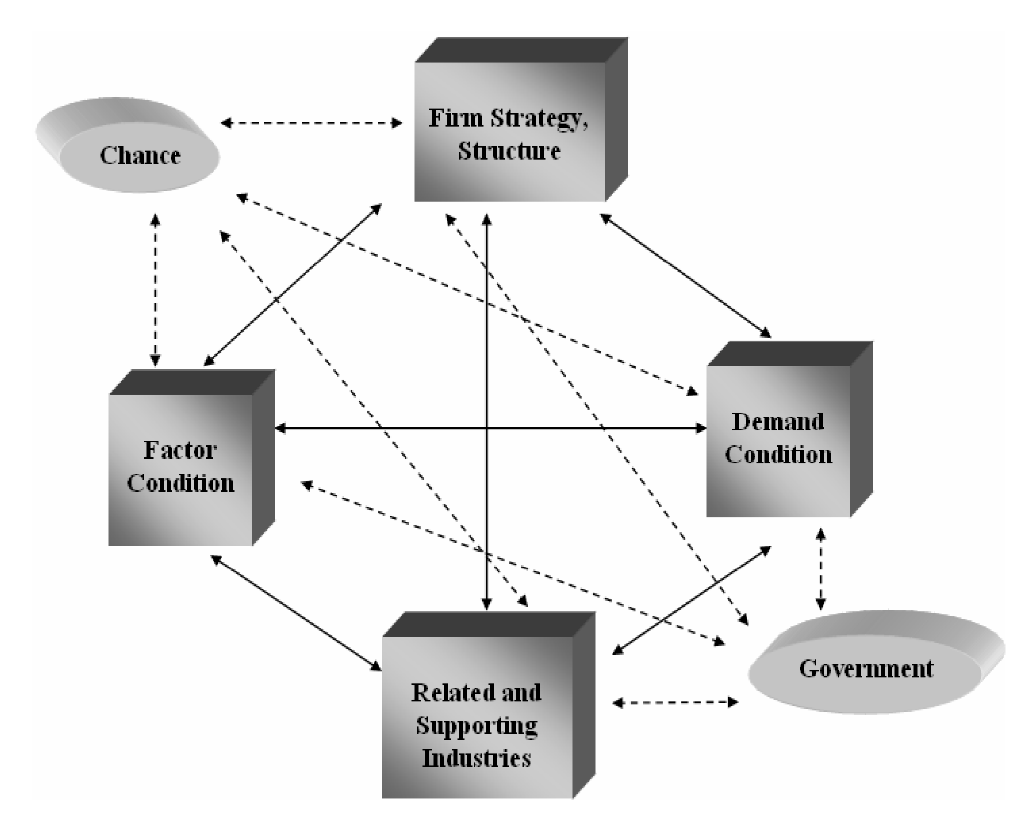
Related and supporting industries, they include industries that can produce inputs important for innovation and internationalization of the dairy sector. When local supporting industries and suppliers are competitive, home country companies will potentially get more cost efficient and receive more innovative parts and products. This will potentially lead to greater competitiveness for national firms. (Porter, M.E. (1990))

Firm strategy, structure and rivalry represent the fourth determinant of competitiveness. The way in which companies are created and managed is important for success. The structure and management systems of firms in different countries can potentially affect competitiveness. If rivalry in the domestic market is fierce, companies may build up capabilities that can act as competitive advantage on a global scale. Home market with less rivalry may therefore be counterproductive and act as a barrier in the generating global competitive advantage such as innovation and development. (Porter, M.E. (1990))

Government can influence each of these four determinants of competitiveness. Clearly, governments can influence the supply conditions of key production factors, demand conditions in the home market, and competition among firms. Besides, governmental interventions can occur at local, regional, national or supranational level. **Chance**s are events that occur outside of the firm control such as the economics and financial crises. They are important because they create discontinuities in which some gain the competitive positions and some lose.

The individual points on the diamond as a whole affect four ingredients leading to a national competitive advantage. These ingredients are: the availability of resources and skills, information firms use to decide which opportunities to pursue with those resources and skills, individuals goals in companies and the pressure on companies to innovate and invest. (Porter, M.E. (1990))

Figure (2) shows porter's diamond model, the solid lines shows the main relations which reciprocally affect each other, while the dotted lines have lower reciprocally affect on the main factors of the model.



Source: Porter, M.E. (1990, 1998), The Competitive Advantage of Nations, Free Press, New York, 1990.

Figure 2: Porter's Diamond Model

3-2-2 Revealed Comparative Advantage (RCA)

- Balassa (1965) was the first researcher who developed a measure of RCA. Revealed Comparative Advantage can be written as follows:

$$RCA\ (B) = \frac{X_{ik} / X_i}{X_{wk} / X_w}$$

Where:

X_{ik}= Country i's export of goods K

X_i= Country i's exports of all goods (All Exports of Dairy Products)

X_{wk}= World exports of good k

X_w= World exports of all goods (All Exports of Dairy Products)

If:

RCA > 1, then comparative advantage revealed.

RCA < 1, then no comparative advantage revealed.

Vollrath (1991) offered three alternative specifications of Revealed Comparative Advantage, they are:

1- Revealed Relative Comparative Advantage Export Index (RXA):

The RXA is defined as a country's export share relative to all other countries export of the specific product category. This index is the same as the Balassa RCA.

RXA = RCA (B)

2- Revealed Relative Import Penetration Index (RMP):

The RMP is defined as a country's import share relative to all other countries imports of the specific product category.

$$RMP = \frac{M_{ik} / M_i}{M_{wk} / M_w}$$

Where, M represents the imports.

3- Revealed Relative Trade Advantage Index (RTA):

This index gives the difference between the RXA and RMP.

RTA = RXA – RMP

The RTA is implicitly weighted by the importance of the relative export and the relative import advantage.

If:

RTA>0 the goods have certain competitive advantages;

RTA<0 the goods don't have competitive advantages.

The advantage of using the comparative advantage index is that it considers the intrinsic advantage of a particular export commodity and is consistent with changes in an economy's relative factor endowment and productivity. The disadvantage, however, is that it cannot distinguish between the improvements in factor endowments and pursuit of appropriate trade policies by a country. (Batra Z. 2005)

The chosen countries for applying the comparative advantage with are the Arab world countries (MEAN countries). These countries were chosen based on how deep does Jordan deal with countries in dairy products, especially the whole cow milk cheese, this product was chosen because it has mutual export and import between Jordan and MENA countries.

Chapter 4

Results and Discussions

4-1 Dairy Sector Agents

This study covered several agents. For each agent a questionnaire related to the dairy agribusiness sector was designed and tested to cover the competitive pattern. Also, the factors that affect this sector were tested. Porter's Diamond Model was applied according to the answers of each agent.

4-1-1 The Dairy Sector Marketing Channels

Figure (3) shows the marketing channels and the agents for the dairy sector in Jordan; about 60% of the dairy products are locally produced, while the remaining dairy products are imported to meet the needs of the Kingdom. As indicated earlier, the dairy sector's main channel is as follows: 48% of the milk produced goes to the processing plants; where 29% goes directly to the dairy processing plants, and 19% goes to the processing plants through cooperative, after the dairy products are manufactured, 26% of the production goes to the retailers and then to the final consumer. The rest of the marketing channels are illustrated in figure (3).

After the dairy marketing channels is showed, each agent is illustrated in the next section of the study.

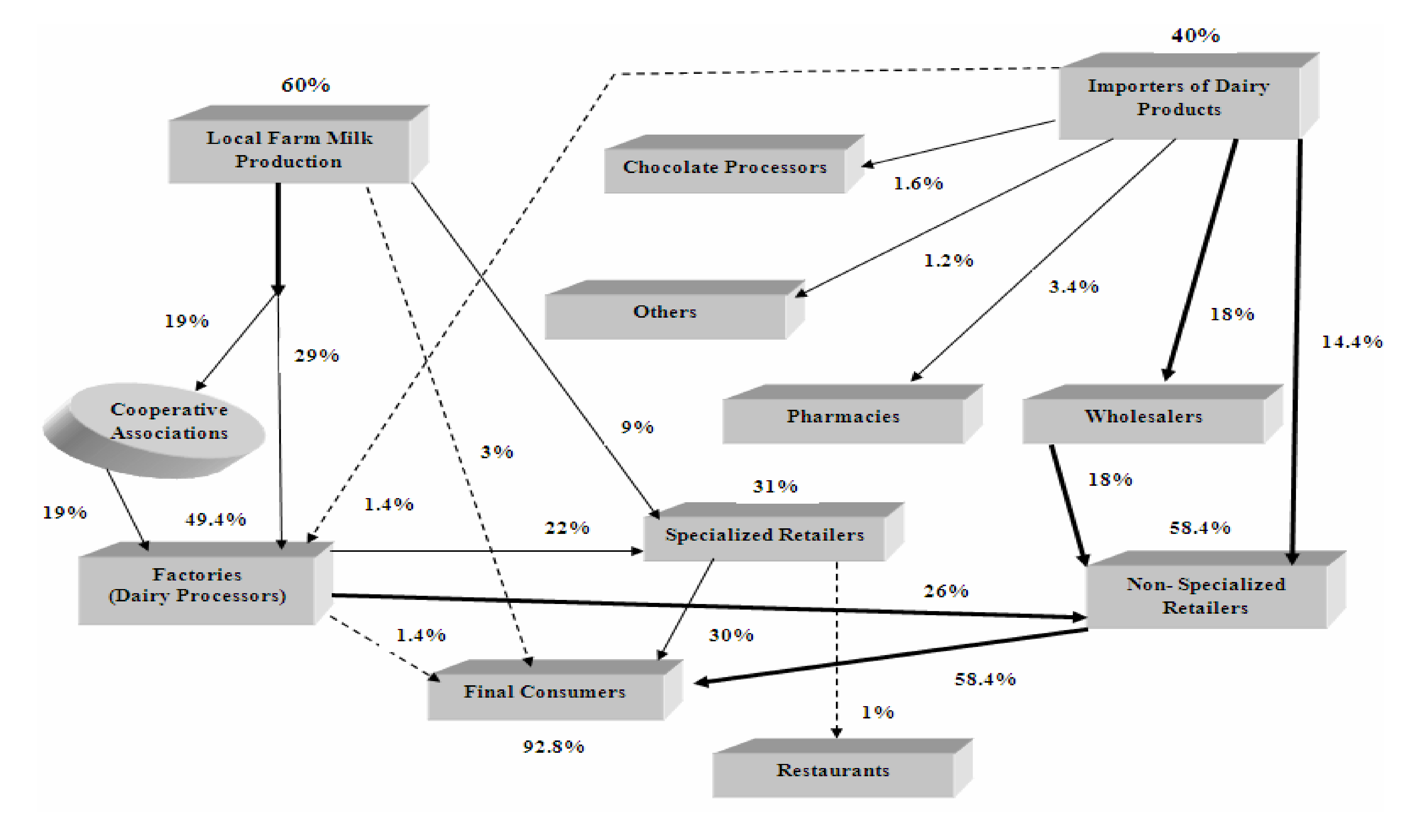


Figure 3: Dairy Sector Marketing Channels in Jordan

4-1-2 Dairy Cows Farms Agent

A. Inputs

I. Livestock

The data were classified according to the number of livestock in the farm; 500 cows and more were classified as group (A), 300-499 cows were classified as group (B), 100-299 cows were classified as group (C), and 16-99 cows were classified as group (D). The analysis was conducted due to these classifications.

The average productive life for cows were 5.4 years, 5 years, 4.6 years, and 4.4 years for groups (A), (B), (C), and (D) respectively. The productive life of dairy cows in groups (A) and (B) farms are higher than groups (C) and (D) farms, this clarifies partially the higher milk production in the first two groups.

II. Livestock Feeds

Livestock feeds are divided into two components, concentrates and roughages. The concentrates includes barley, wheat bran, soya, yellow corn, all contents of the concentrates must be in a specific amount. The main roughages are alfalfa, silage, hay, and green clover. In addition, the feed additive which are dry fat, anti-fungus, salt, and vitamins are given to the cattle.

The quantity consumed by each farm depends on the number of the productive dairy cows in the farm. Quantities consumed by individual cows are 13.04 Kg/head/day and 20.29 Kg/head/day of concentrates and roughages respectively for group (A) farms which are higher than the other groups as shown in Table (11).

Table 11: Daily Consumption of Livestock Feeds

Categories		Total Consumption per Day(Ton)	Average Consumption per Head per Day (Kg)
A	Quantity of Concentrates	13.33	13.04
	Quantity of Roughages	25.27	20.29
B	Quantity of Concentrates	2.94	10.33
	Quantity of Roughages	3.48	15.32
C	Quantity of Concentrates	1.24	9.93
	Quantity of Roughages	1.57	15.20
D	Quantity of Concentrates	0.54	9.86
	Quantity of Roughages	0.74	15.32

III. Vaccines and Medicines

The study found that for group (A) about 77.8% of them employs a full time veterinary in their farms because they are concerned with the health of the livestock in the farm. Moreover, about 41.7% of group (B) farms employ a full time vet. On the other hand, about 11.1% of group (C) farms and about 4% of group (D) farms employ full time veterinaries.

Figure (4) shows that groups (A) and (B) farms are highly concerned with the livestock health than groups (C) and (D), where 41% of group (D) farms and 19% of group (C) farms call the vet for emergencies only. That is why they can't afford the cost of a full time vet or get the vet more than few times to check on the livestock health or maybe they depend on the Ministry of Agriculture.

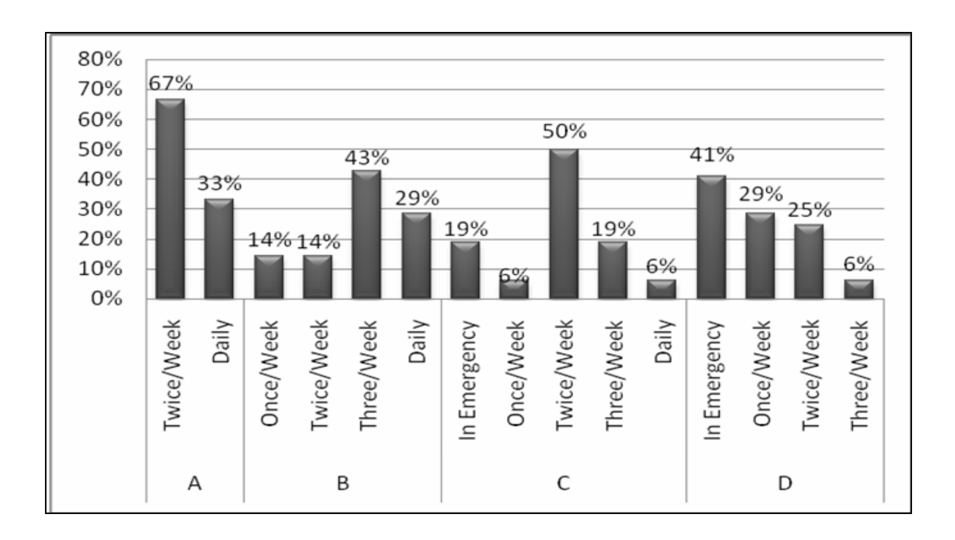


Figure 4: Number of the Vet Visits

Moreover, most of the farms said that drugs have negative impact on the milk production, and the impact was on the quantity of the produced milk directly after vaccination.

Figure (5) shows that 51% of the farmers suffered from a 5% decline of the milk production for two days after vaccination and 26% of farmers suffered from a decline of the milk production for three days.

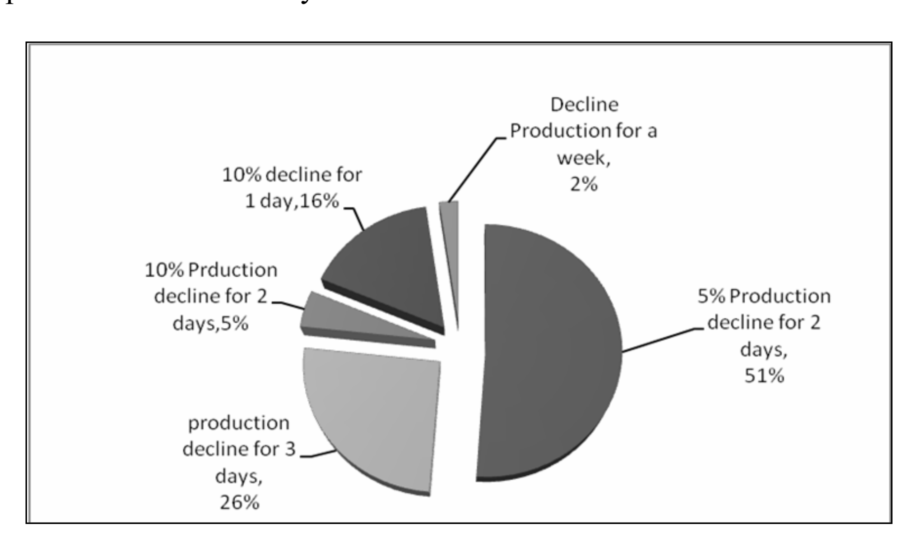


Figure 5: Drugs Impact on the Quantity of Milk Production

IV. Labors

The labors in the dairy farms in the sample are divided into two categories: skilled labor and unskilled labors.

Table (12) shows that group (A) farms are concerned with hiring skilled labor more than the other groups; this will lead to more organized and developed farms, which lead to efficiency in production more than the other groups.

Table 12: Average Number of Skilled and Unskilled Labors

Categories		Minimum	Maximum	Mean
A	Number of Skilled Labor	1	16	6
	Number of Un-Skilled Labor	8	75	29
B	Number of Skilled Labor	0	4	2
	Number of Un-Skilled Labor	4	12	7
C	Number of Skilled Labor	0	1	0
	Number of Un-Skilled Labor	2	5	3
D	Number of Skilled Labor	0	1	0
	Number of Un-Skilled Labor	1	5	2

V. Machines and Tools

All farms in group (A) have automatic milking units; 66.7% of group (B) farms have automatic milking units. In group (C) farms, all the farmers are using semi-automatic machines, and 88.2% of group (D) farms are using semi-automatic machines. For the rest of group (D), they used the traditional way in milking the dairy cows.

All of group (A) farms use the latest technology of milking mechanisms in their herds, while 66.7% of group (B) farms use the latest technology in theirs. As for group (C) and (D), they are not using the latest technology for the milking process. Using computerized machines with a new technology needs an investment cost, so group (C) and (D) farms can’t afford such technology.

Figure (6) shows how many times the farms conduct maintenance to their machines, especially the milking machines. About 88.9% of group (A) farms conduct maintenance to their machines more than seven times per year. Moreover, about 50% of group (B) farms conduct maintenance more than seven times per year. On the other hand, about 27.8% of group (C) farms conduct more than seven times to their machines

per year, and only 4.4% of group (D) farms conduct more than seven times to their machines per year. This leads to the conclusion that large sized farmers can afford maintenance cost more than the small ones.

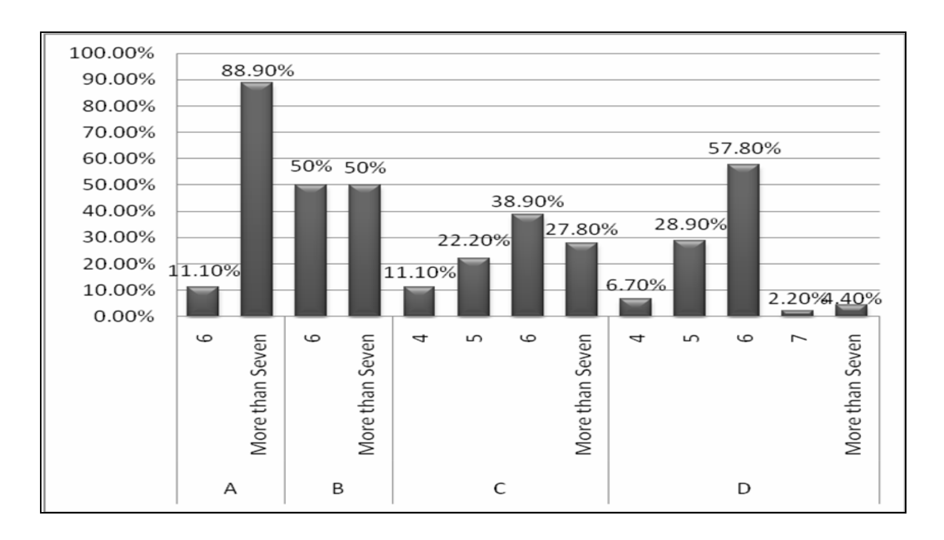


Figure 6: Milking Machines Maintenance per Year

VI. Buildings

There are two kinds of buildings in the dairy farms: the barns and yards. Barns are closed buildings using cements and stones. There are three types of barns: one used for health care to the livestock, one used as a nursery for the new born calves, and one used for milking the cows. Yards are considered as wide open fields where the livestock stays there under shade.

About 100%, 41.7%, 38.9%, and 17.6% of groups (A), (B), (C), and (D) farms respectively, are using barns in their farms, and that shows that large farms are concerned with the health and medical care for their livestock more than small ones do.

VII. Milk Storage

The milk storage is a very important unit in any dairy farms. It is also a sensitive process since milk is a perishable product and need to be carefully dealt with.

All farmers in group (A) and (B) store their production of milk in specialized storage place, while 94.4% of group (C) farms store their milk production, and just

47.1% of group (D) farms store their production. This shows that group (D) that represents the small farms who do not store their production for two reasons: lack of money and selling milk directly to the processing plants before the milk is spoiled.

Farms who store their milk production use the cooling tanks to cool down the milk until it is transported to the processors. The majority of group (A) farms store their milk production for less than 24 hours; the other groups agreed that they store their milk production for less than 24 hours.

Loss and waste during storage are important to the farms. They show the efficiency of the farms and show if they are managing their farms rightly. About 66.7%, 50%, 58.8%, and 37.5% of groups (A), (B), (C), and (D) farms respectively, have no loss or waste during the storage period. The loss and waste for average produced milk for all the farmers during the storage period was less than 2%.

B. Production

I. Average Milk Productivity

It was found that group (A) farms have the largest productivity with 15.38 liter/lactating cow/day. Group (B) farms came in the second place with 12.37 liter/lactating cow/day. Group (C) farms productivity is close to group (B) productivity. Group (D) farms have the lowest productivity with 10.28 liter/lactating cow/day. The reason behind the difference in productivity average between groups is that large farms have a better medical care, feed and organization.

II. Seasons of Milk Production

The farmers were asked if seasons have affects on the production of milk. All farmers agreed that in spring and fall the milk production remains the same, but some of the farmers noticed a change in the production of milk in summer and winter seasons.

There are two types of changes on the milk production in summer, change in quantity of the produced milk and change in the level of concentrates of the produced milk. About 55.6%, 33.3%, 22.2%, and 23.5% of groups (A), (B), (C), and (D) farms respectively, said that there is an increase in the milk production in summer. As for the level of concentrates level, about 33.3%, 8.3%, 5.6%, and 11.8% of groups (A), (B), (C), and (D) farms respectively, suffers from decrease of the concentration level in summer. This is because the cows drink more water in summer and the cows don't need to transfer the energy they have into heat, so the quantity of the produced milk increases, and concentration level decreases.

There are two types of changes on the milk production in winter, change in quantity of the produced milk and change in the level of concentrates of the produced milk. About 100%, 100%, 77.8%, and 90.2% of groups (A), (B), (C), and (D) farms respectively, suffers from a decrease in the milk production in winter, while about 44.4%, 8.3%, 5.6%, and 13.7% of groups (A), (B), (C), and (D) farms respectively, said that the level of concentrates increase in winter. This is because the cows drink less water in winter and cows transfer the energy they have into heat in winter, which reduces the amount of milk production, so the quantity of the produced milk decreases, and concentration level increases.

III. Times of Milking

Figure (7) shows that the majority of Groups (A) and (B) farms conduct the milking process three times per day, for group (C) farms varies between three and two times in a day. For group (D) farms, about 98% of whom conduct the milking process only twice per day; that is because most of the group (D) farms don't store their milk production.

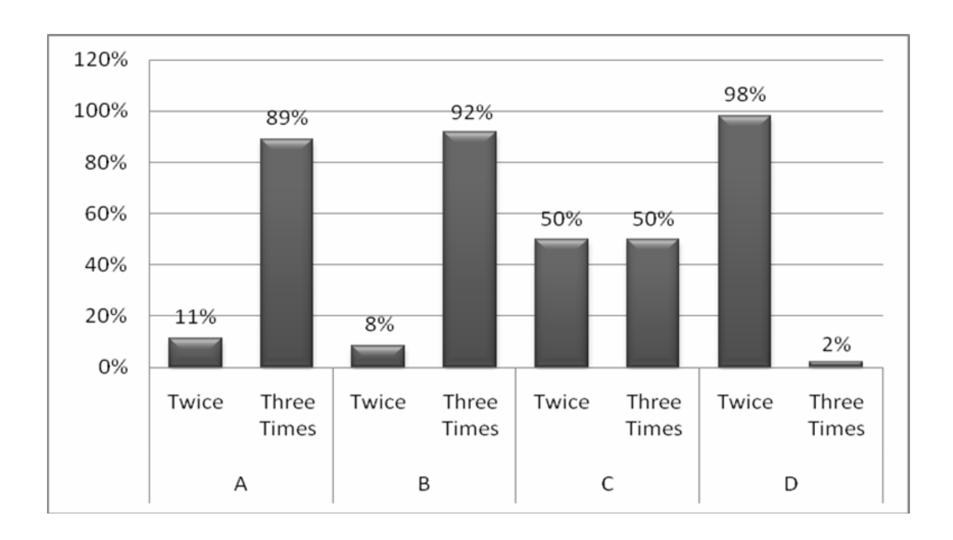


Figure 7: Times of Milking per Day

Groups (A), (B), and (C) farms prefer to conduct the milking process in the morning and night. Some of groups (A), (B), and (C) farms conduct at noon, and some of them in the after-noon period. All group (D) farms conduct milking in the morning, while about 47% of this group conduct milking in the after-noon period, and 54.9% of this group conduct milking at night. The farmers who conduct the milking process in the after-noon period do not store their produced milk as shown in figure (8).

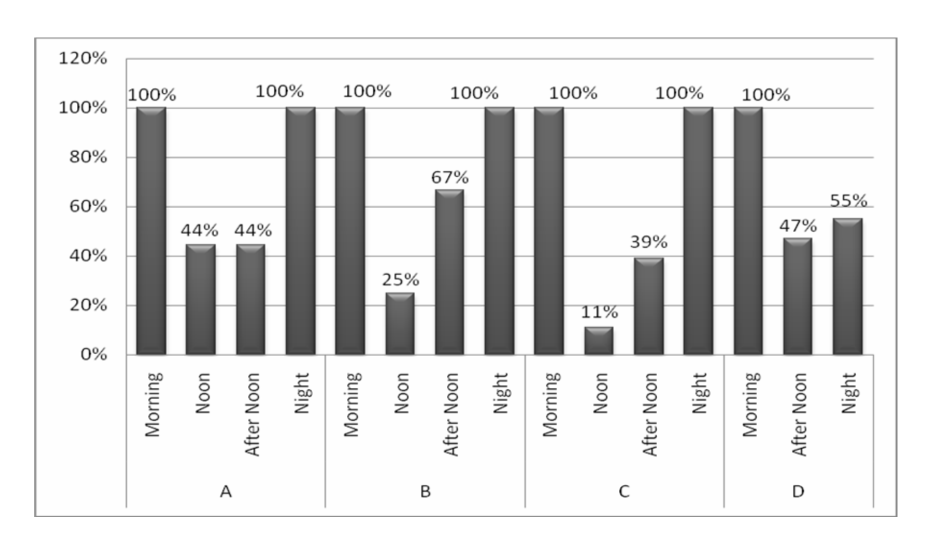


Figure 8: Time of the Day for Conducting Milking Process

IV. Price of Produced Milk

The average prices are 0.37 JD/Litters, 0.33 JD/Litters, 0.32 JD/Litters, and 0.34 JD/Liters for groups (A), (B), (C), and (D) farms respectively.

C. Processing

The farmers in the sample do not process milk in their own farms.

D. Distribution

I. Milk Destination

After the production, farms deliver the milk to dairy processing plants, cooperatives, final consumer, or specialized retailers. Figure (9) shows that group (A) farms sell milk only to the dairy processing plants. As for groups (B) and (C) farms they sell it through the cooperatives that help the farmers in the marketing process, they sign contracts with factories, conduct the delivery of the milk, and help providing the concentrates. Group (D) farms deal with more than one destination; the highest one is the specialized retailers then the dairy processing plants, while they sell small quantities directly to the final consumers.

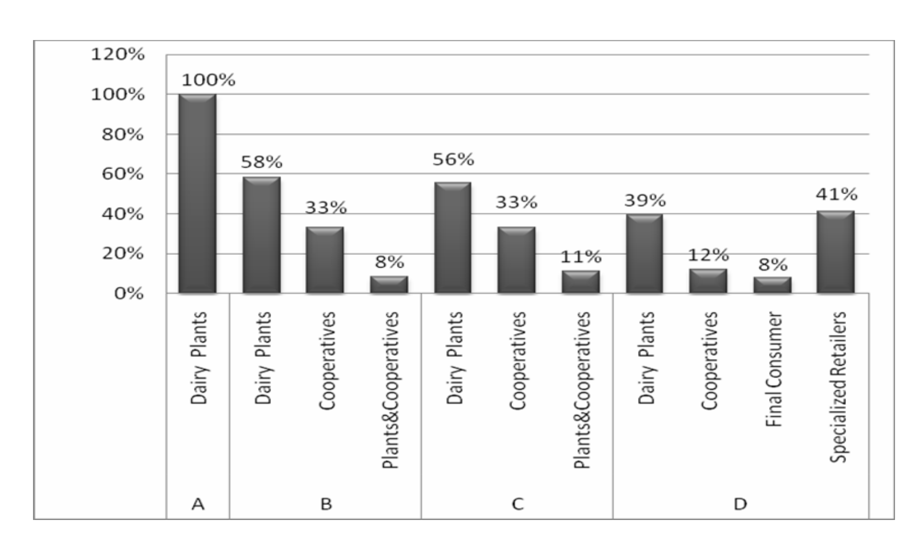


Figure 9: Milk Production Destination

II. Transportation

About 77.8% of group (A) farms own transportation vehicles; the rest said that the processing plants that they are dealing with transport the raw milk. About 33.3% and 22.2% of groups (B) and (C) farms respectively, own a transportation facility. This is because most of group (B) and (C) farms deal with cooperatives that are responsible for the delivery of the raw milk to the factories. For group (D) farms, 62.7% of them

own a transportation method, but it's not as advanced as the other groups as shown in the next section.

There are two types of transportation facilities: armored tanks and pickups carrying small tanks. Armored tanks are better than pickups; they protect the milk from getting spoiled and preserve its temperature till it reaches the targeted destination.

Groups (A) and (B) farms are the only groups that use armored tanks as a transportation facility, while groups (C) and (D) farms are using pickups.

III. Contracts

The farms were asked if they sign contracts with buyers, and the following figure shows how many of each category signs contracts with buyers.

The results were 55.6%, 58.3%, 38.9% and 9.8% of groups (A), (B), (C), and (D) farms respectively, sign contracts with buyers. This shows that groups (A) and (B) farms want to guarantee their rights. On the other hand, most of group (D) farms don't sign contract with buyers. This makes group (D) farms rely on trust, and their rights are not guaranteed.

Group (A) farms signed contracts with dairy processing plants, while groups (B) and (C) farms contracts were mostly signed with the cooperatives.

The sellers represent forage sellers, livestock sellers, and other input sellers. It was found that all of the farms from the four categories have the same pattern in signing contracts with sellers as with buyers. They depend on trust between them.

E. Costs

Table (13) shows the average costs for the operational cost. The most important and the highest cost are the feeds cost; it constitutes about 87.45%, 87.82%, 87.66%, and 86.46% of the total operational costs for groups (A), (B), (C), and (D) farms regarding operational costs respectively.

Table 13: Operational Average Costs per Farm

Categories	Costs	Average Costs (JD/Head)	Percentage (%)
A (1593 Heads/Farm)	Feed Cost	111	87.45
	Labor Cost	6	4.63
	Transportation Cost	2	1.72
	Maintenance Cost	1	0.83
	Vaccines and Treatments Cost	3	2.20
	Water Cost	2	1.56
	Electricity Cost	2	1.61
	Total	127	100.00
B (302 Heads/Farm)	Feed Cost	105	87.82
	Labor Cost	7	5.60
	Transportation Cost	2	1.72
	Maintenance Cost	1	0.91
	Vaccines and Treatments Cost	1	1.24
	Water Cost	2	1.61
	Electricity Cost	1	1.11
	Total	120	100.00
C (127 Heads/Farm)	Feed Cost	97	87.66
	Labor Cost	7	5.92
	Transportation Cost	1	0.99
	Maintenance Cost	1	0.94
	Vaccines and Treatments Cost	2	1.94
	Water Cost	2	1.75
	Electricity Cost	1	0.79
	Total	111	100.00
D (55 Heads/Farm)	Feed Cost	106	86.46
	Labor Cost	8	6.24
	Transportation Cost	3	2.13
	Maintenance Cost	1	0.71
	Vaccines and Treatments Cost	2	1.21
	Water Cost	4	2.65
	Electricity Cost	1	0.61
	Total	124	100.00

On the other hand, the most important element in the investment costs is the animal value. In average the cost of the Dutch cows are 1800 JD/Head, and for the local cows the average cost is 1200 JD/Head.

4-1-3 Dairy Processing Plants Agent

Dairy processors are the second agent in the dairy sector. A questionnaire was prepared to cover all the related elements in Porter's Diamond Model. The processing plants were divided into three categories large, medium, and small processing plants depending on the size of the invested capital for each category. Actually they were collected from different governorates.

Each category of the dairy processing plants produced different dairy products. Figure (10) shows the kinds of dairy products produced for each category. Large processing plants are the only category that produces pasteurized fresh milk, long life milk, sweet cream, and kashkaval cheese.

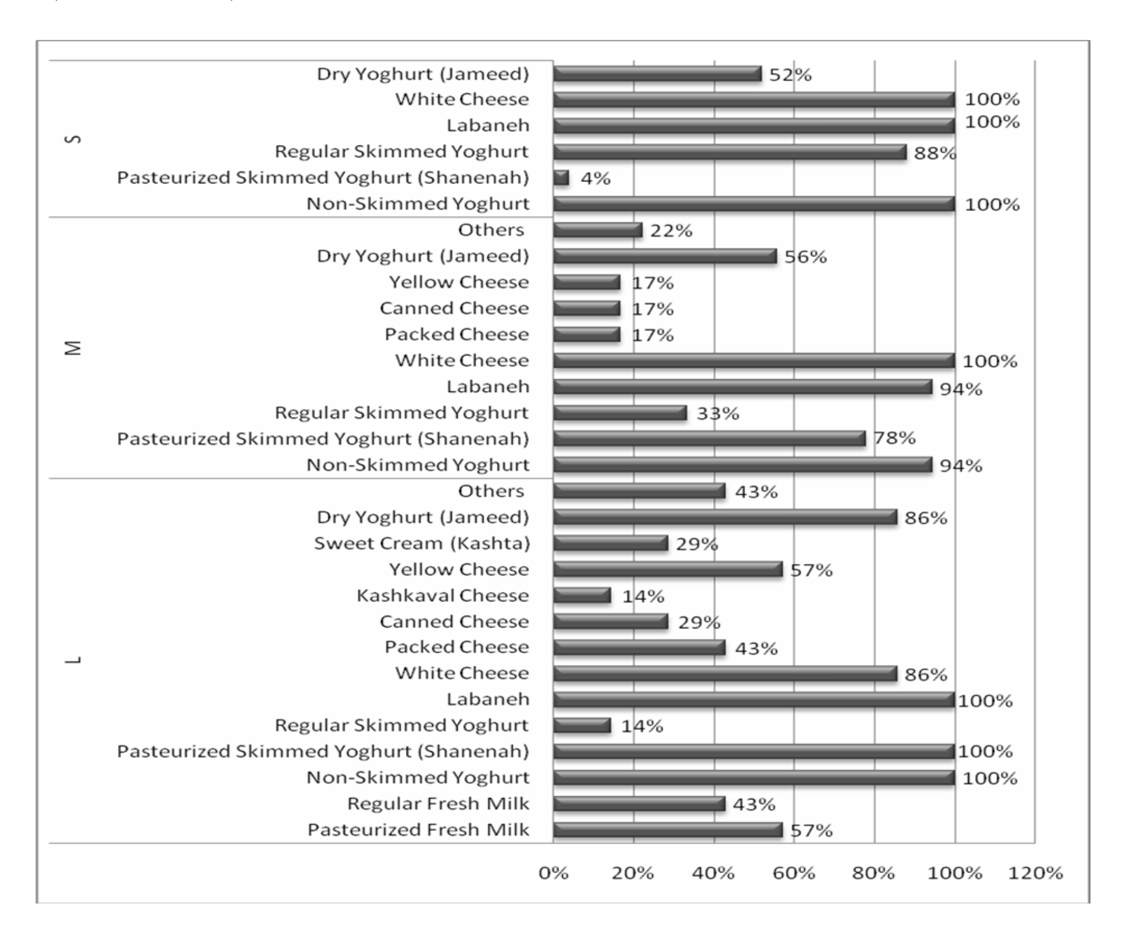


Figure 10: Kinds of Dairy Products Produced

A. Impact of Factors on Business

In this section there are several factors that have been studied to show the impacts on the dairy agribusiness sector.

I. Access to Financing

Processing plants were asked if they have access to finance in Jordan or if it is easy to get the capital of money to their projects. The results were as follows: 71.4%, 61.1%, 28% of large, medium, small processing plants respectively, don't have a problem accessing to finance in Jordan. That concludes small factories have problems with the capital of money to support their projects.

II. Illegal Competition

For large and medium processing plants 71.4% and 72.2% respectively, illegal competition wasn't a problem. But for the small processing plants about 48%, of them consider the illegal competition as a real issue.

III. Workforce

About 85.7% of large processing plants don't have problems regarding educated workforce. But as for medium and small processing plants, about 61.1% and 100% respectively, said that it is a problem. The small processing plants said that it is a problem because they can't afford to pay high salaries for educated employees.

Work ethics are important for the development of the dairy sector for Jordan and in increasing the efficiency of this sector. Work ethics are the values of hard work instilled in or held by employees; an employee with a good work ethics would complete their jobs and other tasks with a high quality and take pride in the quality of his or her work. 85.7%, 94.4%, and 100% of large, medium, and small processing plants respectively, have an extremely problematic issue with the poor national work ethics,

and this will lead to a negative impact on the efficiency and development of the dairy sector in Jordan because labors don't give their full potential capacity in work.

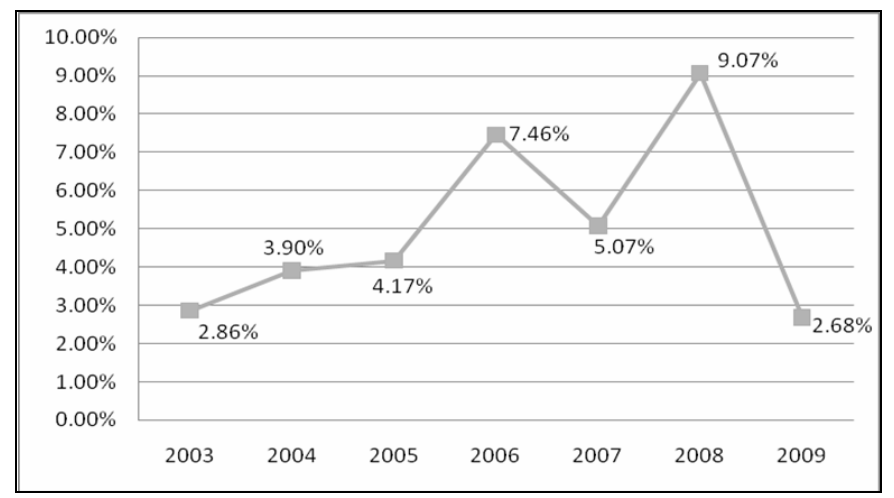
As for the regulatory system and regulations stated by the government for labors. The findings were that about 71.4% and 50% of large processing plants and medium processing plants respectively, are affected with such restrictive labor regulations such as minimum labor wages, safety precautions, and working hour set by the government. For the small processing plants, about 36% of them faced minor problems with this issue and this show that the small processing plants don't follow regulations stated by the government.

IV. Inadequate Supply of Infrastructure

Lack of adequate infrastructure, such as sewage system, electricity, and paved roads create many problems to the dairy sector in Jordan. The findings were that 85.7% of large processing plants have no problems in having adequate infrastructure. For medium processing plants, about 61.1% of them faced a problem with inadequate infrastructure, and it stands as a barrier for the medium processing plants to be developed. For small processing plants about 44 % of them faced a problem with inadequate infrastructure.

V. Inflation

Figure (11) shows the inflation rate trend from 2003 to 2009 in Jordan. In 2008 the inflation rate in Jordan increased significantly due to the world economic crises then it decreased significantly in 2009.



Source: International Monetary Fund. Inflation Rate. Annual report. Jordan, 2010

Figure 11: Jordan Inflation Rate 2003-2009

There is a huge concern for inflation from all categories, because inflation leads to a recession because it causes high prices of the products, while the incomes don't increase at the same rate as the price, which will weaken the local demand on the dairy products and will weaken the competitiveness of the dairy sector.

VI. Instability in the Policies

Changing policies will force the factories to adopt new changing policies, which will impose the processing plants to change their strategies and the pattern of work causing instability in the dairy sector, which will stand as a barrier for the development of the dairy sector. Almost all of the factories of the three categories confirmed that instability in the policies is an extremely problematic issue.

VII. Taxes on the Processing Plants

Types of taxes are:

- **Taxation on companies and business**: all companies either local or foreign, operating in Jordan are subjected to corporate income tax which is 15%. (JIB, 2010)

- **Sales Tax**: The taxpayers as defined by the Sales Tax Law are the manufacturers, merchants or service providers whose sales amount to JD 100,000 per annum and on importers of any goods or services irrespective of the volume of their imports. The sales

tax rate ranges from 0 percent up to 20 percent of the value of goods and of services. (JIB, 2010)

High taxes can lead to higher input costs that will lead to high dairy products prices. This will weaken the dairy sector competitiveness, so all processing plants said unanimously that tax rates and regulations form an extremely problematic impact on the dairy sector.

B. Major Problems Faced by Processing Plants

I. Major Problems for Large Processing Plants

Table (14) shows that for the large processing plants, about 85.7% of them said that the major problem is the presence of small processing plants, because small processing plants sell their dairy products in a lower price than the large and medium processing plants do. The second major problem is the increase in the number of competitors in the dairy sector, it may be a problem to these processing plants, but it helps the industry to grow faster. The increase in competitors creates pressure on these processing plants and makes them find a way to compete with others. They will innovate and develop more and will reflect on the development of the dairy sector in Jordan.

Table 14: Large Processing Plants Major Problems

Categories	Percent of Cases
1. The presence of small processing plants	85.70%
2. High Competition	57.10%
3. Lack of qualified workers	28.60%
3. Lack of raw milk in some seasons	28.60%
3. Different point of views of the health officials	28.60%
4. Weak purchasing power of consumers	14.30%
4. There is no obligation from clients to pay	14.30%
4. Cost of raw milk prices	14.30%
4. Marketing Problems	14.30%
4. Taxes Rates	14.30%

II. Major Problems for Medium Processing Plants

The major problems facing medium processing plants are listed and arranged from the most important one to the least one as shown in table (15). Two problems have the same importance to the medium processing plants, lack of qualified workers and high tax rates. About 38.9% of the medium processing plants said that the increase in the number of competitors is a major problem facing them.

Table 15: Medium Processing Plants Major Problems

Categories	Percent of Cases
1. Lack of qualified workers	44.40%
1. Taxes Rate	44.40%
2. High Competition	38.90%
3. Cost of raw milk prices	27.80%
3. Different point of views of the health officials	27.80%
3. Weak government and the inadequacy of the official authorities	27.80%
4. The presence of small processing plants	22.20%
5. Weak purchasing power of consumers	11.10%
5. Lack of raw milk in some seasons	11.10%
5. Marketing Problems	11.10%
5. Lack of Cash Flow	11.10%
5. Economical Polices (Free Trade)	11.10%
6. Production Cost	5.60%
6. Importing Dairy Products	5.60%

III. Major Problems for Small Processing Plants

The major problems facing small processing plants are listed and arranged from the most important to the least one in table (16). It shows that 52% of small processing plants suffer from high cost of raw milk, weak government regulations, and inadequacy of the official authorities.

Table 16: Small Processing Plants Major Problems

Categories	Percent of Cases
1. Cost of milk prices	52.00%
1. Weak government and the inadequacy of the official authorities	52.00%
2. Lack of qualified workers	36.00%
3. Increase in competitors	32.00%
3. Different point of views of the health officials	28.00%
5. Importing Dairy Products	20.00%
6. Lack of Inputs	16.00%
7. Lack of raw milk in some seasons	12.00%
7. Production Cost	12.00%
8. Weak purchasing power of consumers	4.00%
8. Taxes Rates	4.00%

C. Factor Conditions

All processing plants from large and small categories said that the location of their operations is only in Jordan. As for the medium processing plants, 5.6% of them answered that the location of operation is Jordan and worldwide.

I. Source of Raw Milk

Large and small said that they got the fresh milk from the local farms. About 11.1% of the medium processing plants used fresh local milk and imported powder milk which is imported from Europe. The powder milk is used for the white cheese production.

Figure (12) shows that large processing plants are concerned with having the highest possible milk quality to use in the production process, so they check and examine the raw milk before entering it in the processing section. As for the medium and small processing plants, it shows that the quality of the raw milk they are dealing with is less than the large processing plants. Therefore, they can compete by prices. For large processing plants they have the ability to compete by quality more than the medium and small processing plants do.

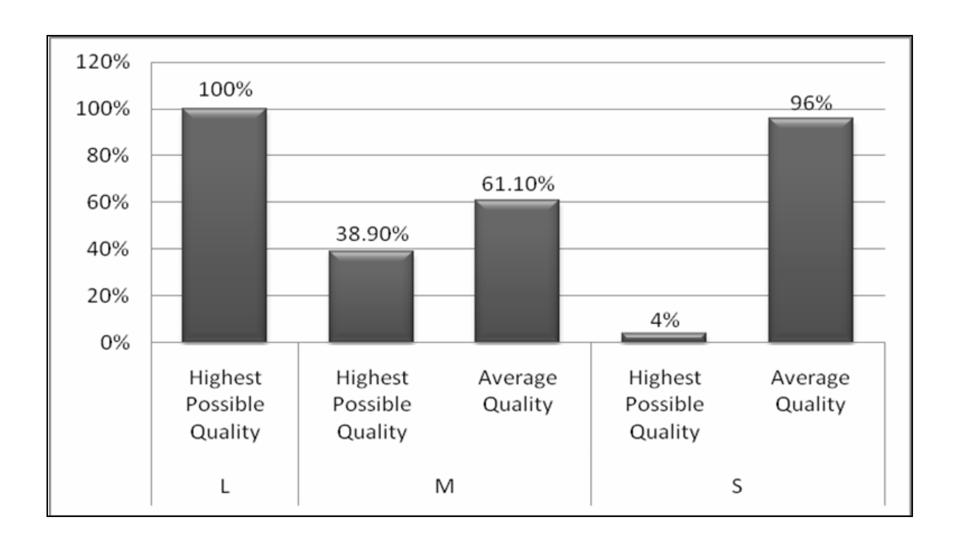


Figure 12: Quality of Received Raw Milk

II. Employees

Figure (13) shows the differences between the three categories, it showed that large processing plants have more concern in hiring skilled labors than the other two categories. The local employees constitute 92%, 83%, and 69% of large, medium, and small processing plants of hired labor respectively. The small processing plants hire less local labors than the other categories do. They prefer to hire foreign cheap labor.

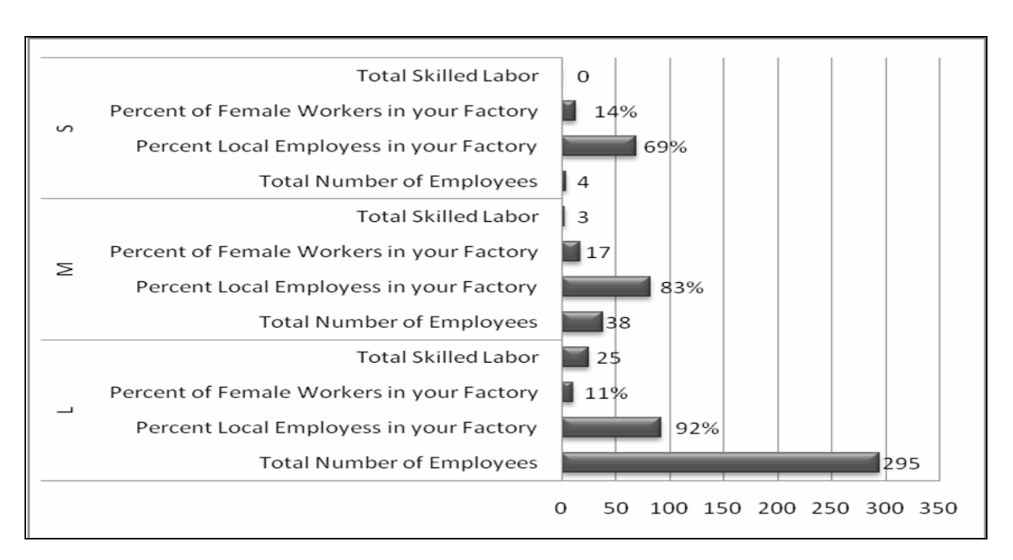


Figure 13: Classification of Employees

Few of large and medium processing plants offer training course to their employees. In addition, they depend on the hired skilled labor in their processing plants. On the other hand, small processing plants do not train their employees.

Because the lack of the training courses offered to the employees, the spending on training courses is very low. This concludes that they are not concerned with spending money on training and prefer to allocate it in other sections of the firm. Figure (14) shows how much the processing plants spend on training their employees.

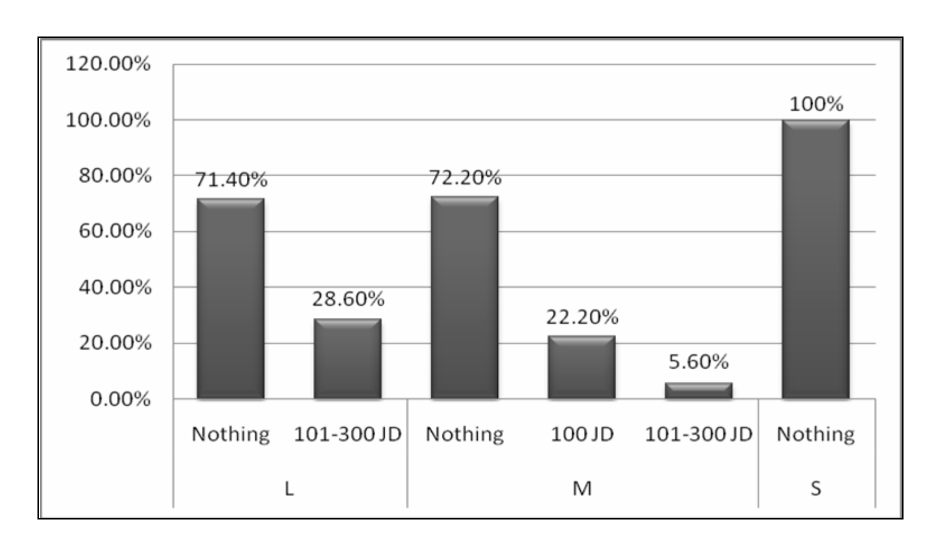


Figure 14: Average Training Spending per Employee

III. Research and Development (R&D)

In order to compete with foreign countries, local processing plants need to be developed and innovated. R&D department is concerned with quality and applying the latest technologies in the dairy sector. About 85.7% and 38.9% of large and medium processing plants respectively have R&D department in their processing plants. This shows how much large processing plants are concerned to be updated with the latest technologies and have the desire to compete with foreign countries by developing themselves. For medium processing plants, they try their best to keep up with the latest technology and in developing themselves. For small processing plants, they don't show any interest in the development processes.

On the other hand, figure (15) shows that 42.9% of the large processing plants who have R&D spend between JD 5000-10000/Year on R&D, and 33.3% of the medium processing plants spend less than JD 1000/Year on R&D.

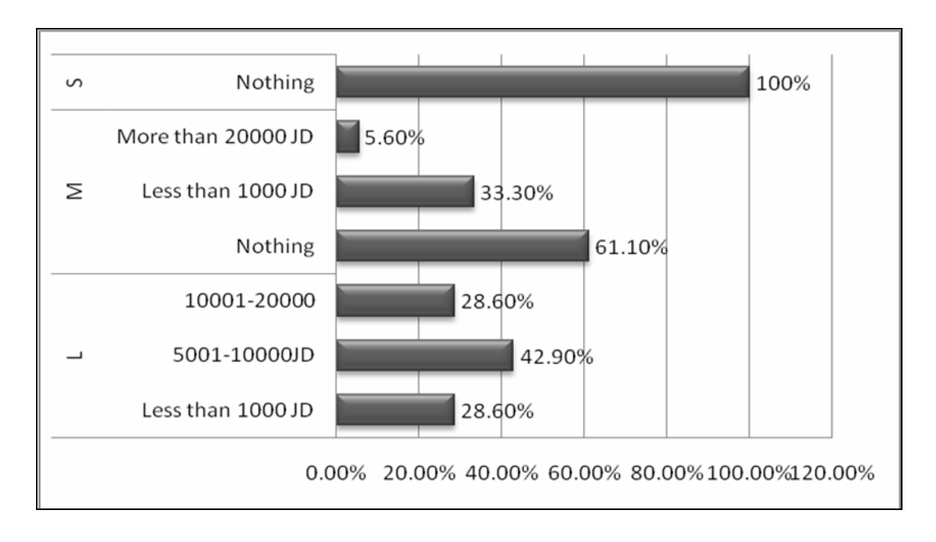


Figure 15: Annually Spending on R&D

IV. Current Policies of the Banking Sector in Jordan

Table (17) shows that most of large processing plants don't have problems with the banking policies in Jordan. About 71.4% of them said that the policies of banking sectors are almost the same. For medium processing plants, they have different opinions for the banking policies in Jordan. About 36.4% of them said that they are the same. 22.7% said that the current banking policies are too restrictive and should be changed or modified to grow their business; and 18.2% said that the current policies help their business grow. For small processing plants, they had a major problem with the banking policies in Jordan. About 52% of them said that they are restrictive and should be changed in order to grow, while 12% of them said that it creates a liquidity problem for their business.

Table 17: Banking Current Policies in Jordan

Categories		Percent of Cases
L	Are the same as Usually (nothing changed lately)	71.40%
	Help my business to grow	14.30%
	Create liquidity problems for my business	14.30%
M	Are the same as Usually (nothing changed lately)	36.4%
	Help my business to grow	18.2%
	Create liquidity problems for my business	13.6%
	Harm my Business	4.5%
	Restrictive, should be changed for my business to grow	22.7%
	Help to strengthen my competitive position	4.5%
S	Are the same as Usually (nothing changed lately)	36.00%
	Create liquidity problems for my business	12.00%
	Restrictive, should be changed for my business to grow	52.00%

V. Quality Certificates

The study is concerned to know if the factories are interested in having the ISO and/or HACCP certificates. Figure (16) shows that 28.6% of large processing plants have the ISO certificate, while 57.1% plan to get it in near future. None of the medium processing plants got the ISO certificate, but 77.8% of them plan to get it in near future. Small processing plants didn't show any interest with getting such certificate. For the HACCP certificate, 42.9% of the large processing plants have the certificate, and 57.1% are interested with getting it in near future. As for the medium processing plants, about 55.6% of them plan to get it in near future, and the small processing plants didn't show any interest to obtain such certificate.

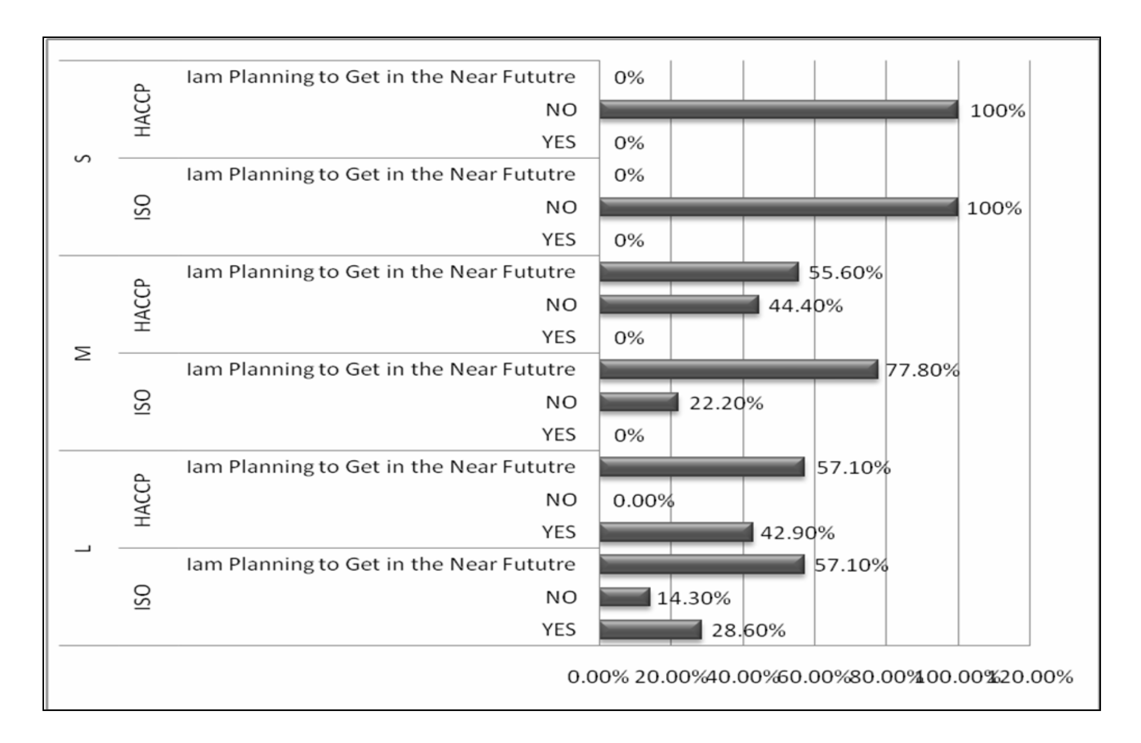


Figure 16: Quality Certificates

VI. Machineries

Large processing plants spend an average of JD 2.55 million to obtain automated and computerized machines. This shows how much they are concerned with producing high quality products with specific standards. For medium processing plants, they spend an average of JD 293 thousand on machineries to try to keep up with the latest technology. For small processing plants, they don't have enough money to purchase high technology machines.

About 5%, 5.83%, and 3.68% of the large, medium, and small processing plants respectively, import inputs for production, while the rest are locally produced. This is a positive sign that processing plants trust the local market, and in turn support the dairy sector in Jordan.

VII. Motivation Scheme

Every firm must have a motivation scheme implemented to motivate its employees and work to reach their maximum labor productivity.

Figure (17) shows that 42.9% of large processing plants were convinced that offering a career path for their employees will motivate them. Career path is defined as the way in which a career develops, and the development depends on a variety of factors like the personal capabilities, skills, experience, and the opportunities available for training and advancement. Although about 42.9% of them didn't have a motivation scheme. For medium processing plants, 50% of them implemented the bonus system as a motivation scheme, since this scheme motivates employees more than any other schemes do. For small processing plants, most of them couldn't offer bonuses to their workers and were convinced with offering them a career path.

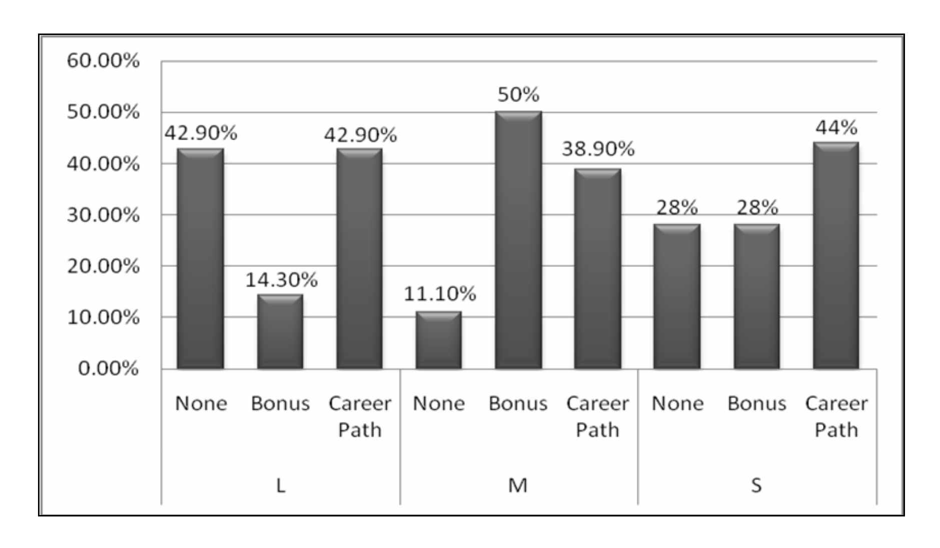


Figure 17: Motivation scheme

VIII. Quality Checking

The processing plants were asked about who checks the quality of the production process in the plant. Large processing plants have their own specialist in quality, called a director of configuration; he is specialized in Total Quality Management (TQM) and executes quality checks daily. As for medium processing plants, about 77.8% of them have a director of configuration specialized in TQM he checks the process of production and quality of the products daily. For small processing plants, the owner of the factory checks the quality of production in a daily manner. Even

though the owner has some experience to check quality, it is not enough to confirm the quality of the production because he doesn't have the enough knowledge and specialty in quality. It shows that large and medium processing plants have concerns in producing dairy products with specific and high quality standards. This is shown in figure (18).

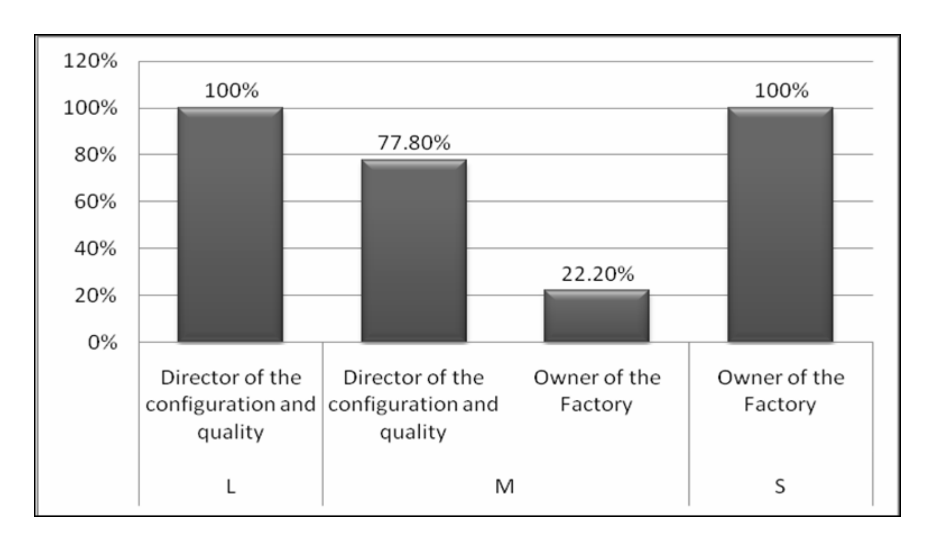


Figure 18: Quality Checking

D. Demand Conditions

I. Destination of the Dairy Products

All dairy processing plants categories targeted the local markets as their main destination. As for the large and medium processing plants, about 14.3% and 5.6% of them respectively, targeted the MENA countries (Bahrain, UAE, Kuwait, and Iraq) for their products.

For the local destination, figure (19) shows the targeted local destinations for each category. The majority of dairy products produced by large processing plants go to the non-specialized retailers. 56.39% of the dairy products produced by medium processing plants go to the non-specialized retailers and the rest to the specialized retailers. The majority of small processing plants dairy products go to specialized retailers.

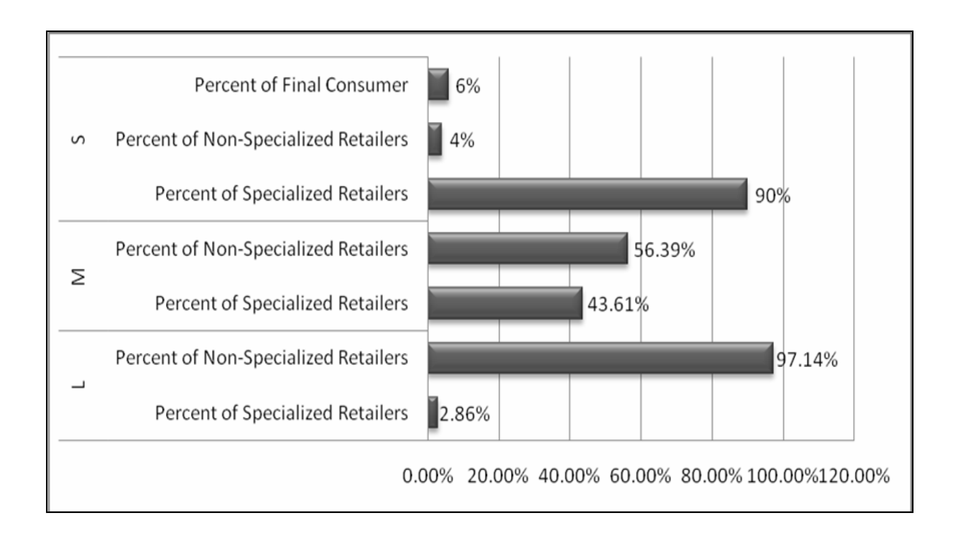


Figure 19: Dairy Products Percentages for Each Destination

II. Dairy Products Demand

Figure (20) shows that 45.5%, 65%, and 88.5% of large, medium, and small processing plants respectively, said that quality and price together affect the purchasing decision of the dairy products by local customers based on their contact with their customers. About 36.4% of large processing plants said that the brand names have an effect on the purchasing decision.

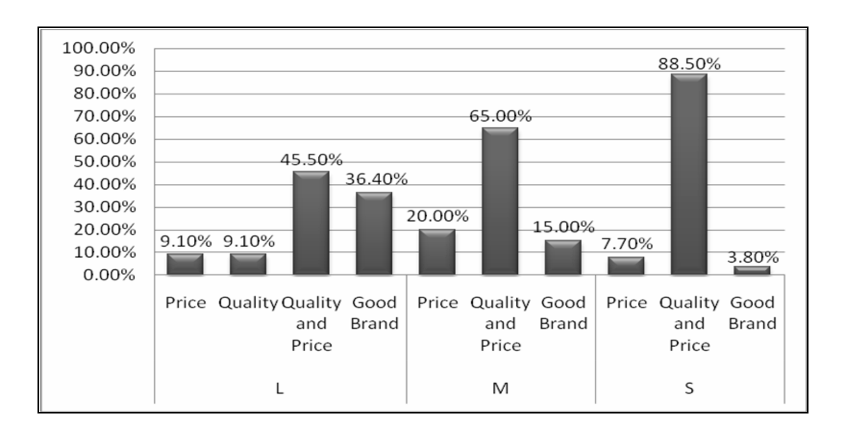


Figure 20: Dairy Products Purchasing Key Factors

Figure (21) shows that there were different opinions on the demand prediction of dairy products in Jordan. Processing plants who predicted that demand of dairy products will increases, explain that this increase in demand is due to the increase of health awareness among people, the development of dairy sector in Jordan, and the population

increase. As for processing plants who predicted that the demands of dairy products of being remain at the same level thinks that the weak purchasing power by people (PPP) while population increase at the same time, and the large numbers of competitors are the cause of this result. Processing plants, who predicted a decrease of the demand on the dairy products, is due to lack of the government support and increase the input prices especially the raw milk prices from farmers.

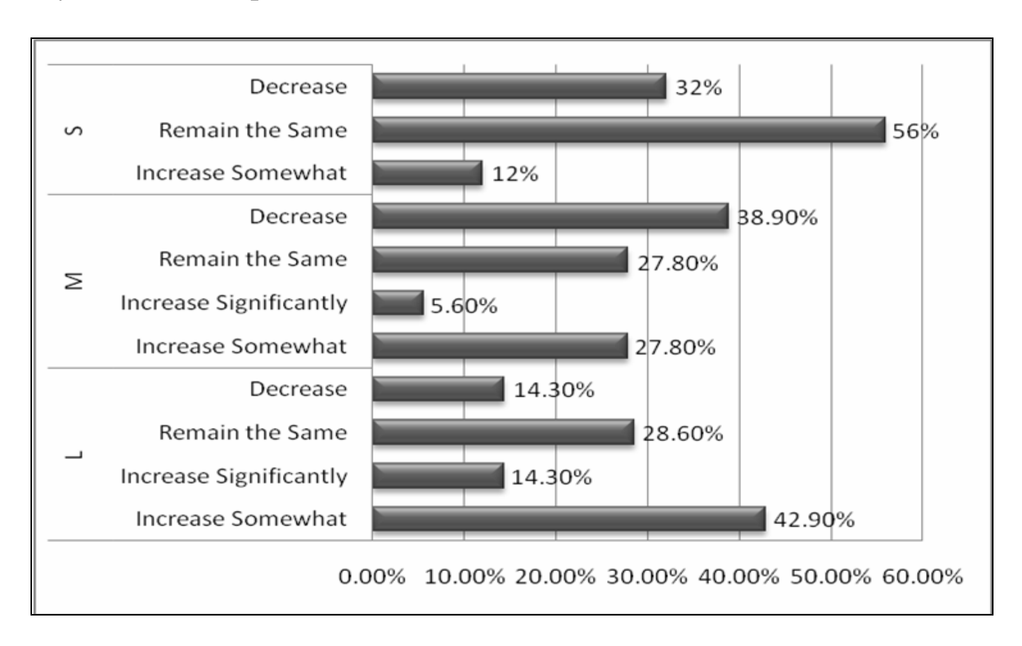


Figure 21: Demand Prediction of Dairy Products in Jordan

E. Firm Strategy and Rivalry

I. Strategy

Overall strategy is defined as the direction and scope of an organization over the long term, which achieves advantages for the organizations through its configurations of resources with a challenging environment, to meet the needs of markets and to fulfill the stakeholder expectations (Johnson G. 2011). It directs firms to meet their long and short run objectives. It gives them an idea of their position among other competitors, and it shows the areas of their weakness and strength. Marketing Strategy is defined as a written plan (usually a part of the overall corporate plan) which combines product development, promotion, distribution, and pricing approach, identifies the firm's

marketing goals, and explains how they will be achieved within a stated timeframe. Marketing strategy determines the choice of target market segment, positioning, marketing mix, and allocation of resources.

The processing plants were asked if they have an overall strategy in general and marketing strategy to their firms in particular. All large and 72.2% of the medium processing plants have an overall and marketing strategies which help them to identify their rivalries, study the market well, and identify the paths they are going to deal with. As for small processing plants, they said that they are not interested with having a marketing strategy because they don't need a strategy to operate their plants and they depend on both the trust and people they know in operating their plants. This shows that small processing plants are not organized, and work regardless the knowledge of the direction of their objectives.

The study showed that all large processing plants have a brand name for their dairy products, while 94.4% of the medium processing plants have their own brand name. This shows that large and medium processing plants want to prove themselves and be influential in the fierce competition of the dairy sector in Jordan. As for small processing plants, only 28% of them have a brand name.

The processing plants were asked to determine their market share of the dairy products in the local market they own. The findings are as follows:

- Large processing plants have the highest percentage of the market shares in the local market. In average they own 31-40% of the local market share. This shows that local consumers prefer the dairy products they produce and that these plants distribute their products all over the kingdom.
- Medium processing plants have less market share than large factories do, with an average percentage of 11-20% of the local market. This shows that medium

processing plants try to compete with large factories by working hard on their quality of their dairy products.

- For small processing plants they have a very low percentage of the market shares, since they contribute with less than 5% of the local market. This is because they only work with consumers who are around them and in the same area they operate. They don't try to cover more than one governorate in the kingdom and are satisfied with the local consumers near them.

II. Rivalry

The processing plants were asked to describe the competition among firms in the dairy agribusiness sector in Jordan. The description for each category is shown in table (18). Findings from the interviews of the dairy processing plants show that they are almost similar in all categories, where 71.4%, 77.8%, and 84% of large, medium, and small processing plants respectively, said the competition among them depends on price, specialization and quality.

Table 18: The Competition among Dairy Agribusiness Sector in Jordan Characteristics

<table>
<tr><th colspan="2">Categories</th><th>Percent</th></tr>
<tr><td rowspan="2">L</td><td>Many Companies Setting their Own Price and Competing on Who has the Lowest Price in the Market</td><td>28.60%</td></tr>
<tr><td>A Group of Institutions that Compete on Both Price, Specialization and Quality</td><td>71.40%</td></tr>
<tr><td rowspan="3">M</td><td>Many Companies Setting their Own Price and Competing on Who has the Lowest Price in the Market</td><td>11.10%</td></tr>
<tr><td>Mostly Low-Priced Companies that Compete on Price with Only a Few Institutions Able to Charge a Premium Price for a Specialized Product</td><td>11.10%</td></tr>
<tr><td>A Group of Institutions that Compete on Both Price, Specialization and Quality</td><td>77.80%</td></tr>
<tr><td rowspan="2">S</td><td>Mostly Companies Charging Lower Prices that Compete on Price with Only a Few Institutions Able to Charge a Premium Price for a Specialized Product</td><td>16%</td></tr>
<tr><td>A Group of Institutions that Compete on Both Price, Specialization and Quality</td><td>84%</td></tr>
</table>

Regarding the drivers of competition among dairy firms, the results were about 71.4%, 88.9%, and 92% of large, medium, and small processing plants respectively, showed that both quality and price are the main drivers of competition.

About main competitors to the Jordanian dairy firms, the three processing plants categories said that the main competitors are local factories in Jordan. This competition between local processing plants is said to be fierce. Other competitors to the Jordanian dairy products come from some of the MENA countries, mainly (Saudi Arabia, Lebanon, Egypt, and Syria), where 71.4%, 33.3%, and 16% of large, medium, and small processing plants respectively, confirmed that there is a strong competition from the dairy products produced by these countries. This is shown in figure (22).

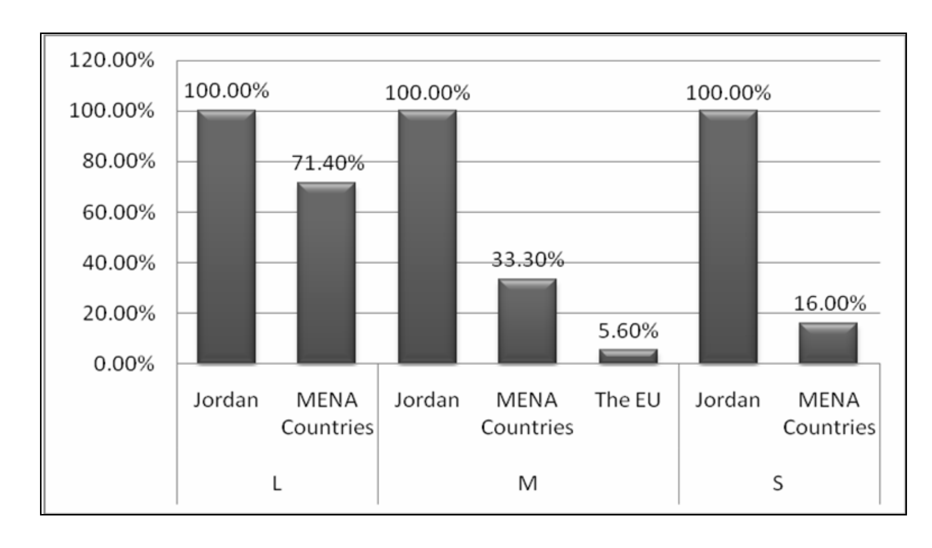


Figure 22: Competitors to Jordanian Dairy Products

F. Related and Supporting Industries

This section is concerned with other industries in Jordan, related to the dairy sector. This study investigated if such industries support the dairy sector and if they affect it positively or negatively.

I. Facilities

Storage is important to the dairy sector since it produces perishable products. So these products are supposed to be stored properly. Large processing plants have an

access to the storage facility. They use high technology to store their dairy products since they use cooled storage rooms, which are automatically controlled. As for medium and small processing plants 94.4% and 92% of them have an access to storage facilities. Some of medium processing plants use high technological storage systems as that in the large processing plants. As for the rest of the medium and the small processing plants, they use refrigerators to store their dairy products.

Large processing plants own cooled transportation vehicles to assure the safety of their dairy products. As for medium and small processing plants, 94.4% and 76% of them respectively, have an access to the transportation facility by their own.

The processing plants confirmed that they didn't have problems with receiving the raw material on time.

Access to the information system is important to develop the dairy sector, and to study local and foreign markets. Information system is defined as an organized collection, storage, and presentation system of data for decision making, progress reporting, and for planning and evaluation of programs. It can be either manual or computerized, or a combination of both (O'Neil 2005). About 71.4%, 83.3%, and 12 % of large, medium, and small processing plants respectively, have access to the information system. It's obvious that large and medium processing plants have more interest to develop than small processing plants do.

II. Packaging

Packaging is important to protect dairy products from the outer environment and to interact with it. Customers prefer good, protective and attracting packaging. Large and medium processing plants said that they get the highest possible quality of packaging. For small processing plants, they deal with less quality because they look for low cost packages.

As for the type of packaging, large processing plants were the only ones that dealt with cardboard packaging, there are no local cardboard packaging produced in Jordan for dairy products, especially for the pasteurized and long life fresh milk, the reason for importing the cardboard is because it costs less than if it is produced locally. For the other products, all processing plants dealt with plastic and nylon-plastic packaging.

All processing plants confirmed that local packaging firms who produce the plastic and nylon-plastic packaging support by providing them with the necessary packaging material in quality and the desired form to their dairy products. Some of the large and medium processing plants were dealing with some foreign countries to provide them with the packaging materials such as cardboard packaging; these materials come from Saudi Arabia, Turkey, and Lebanon.

III. Organizations

In this section the organizations of the dairy sector in Jordan were examined, the results are shown in table (19).

Table 19: Organizations in Jordan

Organizations	Exists in Jordan and provide high quality services			Exists in Jordan and provide low quality services			Do not Exist in Jordan		
	L	M	S	L	M	S	L	M	S
That Provide Services	100%	50%	0%	0%	50%	100%	0%	0%	0%
That Provide Objective, standards and certification	86%	89%	0%	14%	11%	100%	0%	0%	0%
That Provide Specialized training	0%	22%	0%	100%	61%	40%	0%	17%	60%
That Provide Research	71%	12%	4%	29%	88%	96%	0%	0%	0%

Organizations that provide services to the dairy sector include insurance, advertisement, telecommunications, internet services, and maintenance. Large processing plants confirmed that these services exist and with high quality. As for medium processing plants, their opinion varied between high and low quality services. As for small processing plants, they confirmed that services with low quality, as shown in table (19).

About 86% and 89% of large and medium processing plants respectively, confirmed that there are some organizations in Jordan that provide quality and hazard certificates like ISO and HACCP. All small processing plants, said that such organizations exists in Jordan with low quality, as shown in table (19). [1]

For organizations that provide specialized training, all large processing plants confirmed the existences of organizations that help improve skills and capabilities and labor training in Jordan has low quality. As for the medium processing plants, their opinions varied between the existence and non-existence of such organizations. About 61% of them said that they exist but provide low quality. As for small processing plants, about 60% of them said that such organizations don’t exist in Jordan as shown in table (19).

As for organizations that provide researches, the findings indicated that 71% of large processing plants said that organizations that provide research exist in Jordan and provide high quality; these organizations are universities, research institutes and the Ministry of Planning. As for medium and small processing plants, 88% and 96% respectively, confirmed that such organizations exist in Jordan, providing low quality as shown in table (19).

[1] The organizations that provide quality certificates include Lloyds, DNV, and SGS.

G. Government/Chance

The government and the chance represent the outer elements that affect the competitiveness of any sector. Processing plants were asked to evaluate the role of both the government and the chance on the dairy sector in Jordan, if they exist.

The processing plants were asked to evaluate the regulation of environment requirements in Jordan. 57.1% of large processing plants said that it has medium flexibility. As for medium processing plants, they varied in answers, having a medium flexibility regulatory environment with the highest percentage. For small processing plants, 40% of them said that the regulatory environment in Jordan have low flexibility as shown in figure (23).

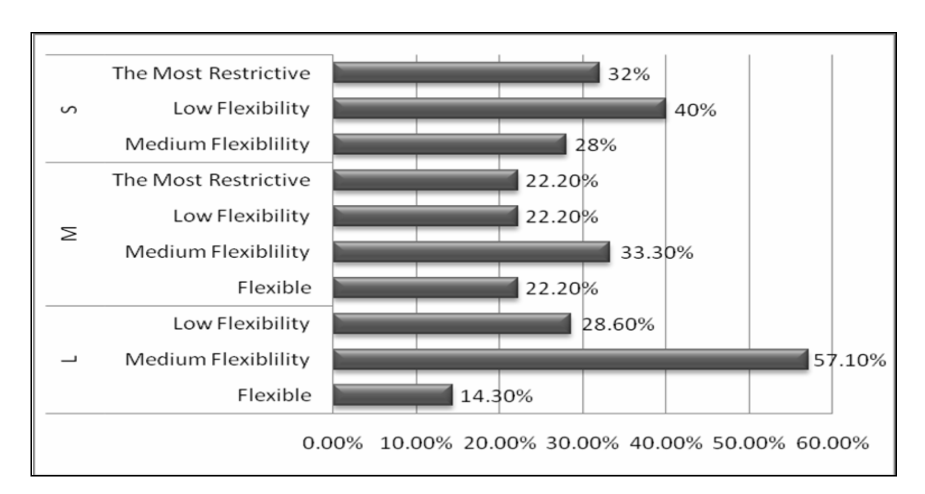


Figure 23: Regulatory of Environment in Jordan

Regarding the tax policy incentives, about 71.4% and 22.2% of the large and medium processing plants respectively, said that there are some tax incentives to the dairy sector in Jordan. For small processing plants, they all agreed that there are no tax incentives in Jordan.

About 57.1% and 50% of the large and medium processing plants respectively, said that the tax incentives were at the starting of the business. This means that when starting any new project or expanding it there will be a support to them. Incentives and exemptions for new investments in Jordan are: projects which are exempted from

income and social services taxes by 25%, 50%, or 75% for the first ten year period, depending on the location and the sector of the project; imported fixed assets are 100% exempted from customs duties and taxes. Imported spare parts for fixed assets are exempted from fees and taxes, up to 15% of the total cost of the fixed asset. Additional exemption from customs duties and income tax is granted for the expansion, modernization, or development of existing projects. (JIB, 2010)

A good government in general is a government that provides services in essential sectors where the relation between output indicators and the amount of resources necessary to achieve it is high, so the processing plants were asked to evaluate the efficiency of the government in assisting the dairy sector in Jordan. About 42.9% of large processing plants said that it is efficient and the same percentage said that it is moderately efficient. For medium processing plants, about 44.4% of them said that it's not efficient, and 40% of small processing plants said it is moderately efficient.

Regarding how the government assesses the dairy sector, the findings indicate that 57.1% and 84% of large and small processing plants said that the government gives a medium importance to the dairy sector in Jordan. As for medium processing plants, about 55.6% of them said that the government gives dairy sector low importance to the government.

Then the processing plants were asked to evaluate interest rates in Jordan. About 57.1% of large processing plants said that interest rates are efficient. Medium and small processing plants 61.1% and 56% of them respectively, said that they are moderately efficient.

Finally, the affect of the global economic and financial crisis on the dairy sector in Jordan was investigated. About 85.7%, 61.1%, and 58.3% of the large, medium, and small processing plants said that the global economic and the financial crisis affected

the dairy sector in Jordan negatively and weakened its competitiveness, by the increase on prices of imported inputs.

H. Export Related Information

The processing plants were asked if they are interested in exporting their dairy products. About 85.7%, 83.3%, and 28% of the large, medium, and small processing plants respectively, have an interest to export their dairy products. For small processing plants, the majority had no interest to export dairy products due to lack of organization, low level of production, and less interest in development.

The processing plants who are interested with exporting their dairy products were asked to determine the problems facing the Jordanian dairy products exports. There were many problems facing the dairy products exports. However, there were three major problems as shown in the table (20), which are:

- High Jordanian dairy product prices as compared to the foreign prices.
- Short expiry dates for dairy products.
- Cost of crude milk.

Table 20: Jordanian Dairy Products Export Problems

Export Problems	Percent of Cases
High Jordan Dairy Products Prices Comparing to Foreign Prices	41.70%
Short Expire Dates for Dairy Products	33.30%
Cost of Crude Milk	33.30%
Slow pace of transactions in the export process	20.90%
Financial Problems	8.30%
Protection of the Local Dairy Product Especially from Internal and Foreign Taxes	4.20%
Small Processing Plants	4.20%

Processing plants were asked if there were any studies related to the potential markets. About 92.3% of the processing plants said that there are no such studies. There were some suggestions for the studies they need to do. First, the size of foreign competition in the dairy sector must be investigated, and then some other studies on

potential foreign markets must be conducted, i.e. which markets are most suitable for Jordanian dairy products.

Processing plants gave some suggestions to support Jordanian dairy product exports. The most important suggestions are:

- Price support by the government (52%).
- Forages support to the farms (36%).
- To cut cooperate taxes (20%).
- To facilitate customs procedures (20%).
- To organize exports process of dairy products (16%)

4-1-4 Retailers Agent

In this study, retailers are divided into two kinds: specialized retailers selling dairy products only and non-specialized retailers such as mini-markets, supermarkets, and grocery stores.

A. Specialized Retailers

Specialized retailers are concentrated in several governorates in Amman, Irbid, Jerash, Ajloun, and Zarqa.

I. Production and Products

The specialized retailer's sample was equally divided by the two retailer's categories, i.e. the specialized retailers producing dairy products and specialized retailers purchasing them.

The specialized retailers who produce dairy products were concentrated in Irbid, Jerash, and Ajloun governorates, because the small dairy cow farms which supply them with the raw milk are concentrated in these governorates. Amman and Zarqa specialized retailers purchase the dairy products from dairy processing plants.

All producers of the specialized retailers get raw milk from small dairy farms close to their shops. About 87.5% of specialized retailers evaluated the quality of the raw milk as better quality.

The average quantity and purchasing prices of raw fresh milk are shown in table (21). Jerash has the highest quantity of purchased raw milk with an average of 418 kilogram/Day. For the purchasing prices, Ajloun has the highest purchasing price with an average of 0.48 JD/Kilogram.

Table 21: Average Purchased Quantity and Price for Raw Milk

Location	Description	Minimum	Maximum	Average
Irbid	Quantity of Raw Fresh Milk in Kilogram	75	600	165
	Purchasing Price of Fresh Raw Milk JD/Kilogram	0.43	0.5	0.46
Jerash	Quantity of Raw Fresh Milk in Kilogram	220	850	418
	Purchasing Price of Fresh Raw Milk JD/Kilogram	0.4	0.45	0.44
Ajloun	Quantity of Raw Fresh Milk in Kilogram	250	500	386
	Purchasing Price of Fresh Raw Milk JD/Kilogram	0.45	0.5	0.48

On the other hand, figure (24) shows that the specialized retailers produce non-skimmed yoghurt, regular skimmed yoghurt, labaneh, and white cheese.

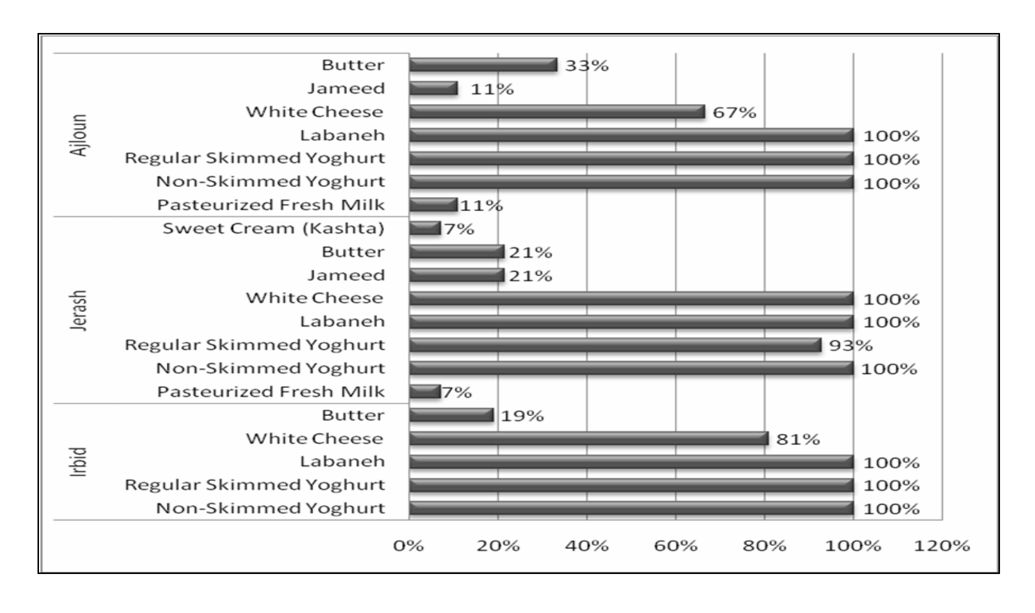


Figure 24: Dairy Products Produced by Specialized Retailers

The average quantity of non-skimmed yoghurt produced by specialized retailers in Irbid, Jerash, and Ajloun are 97 Kg/Day, 123.57 Kg/Day, and 197.78 Kg/Day respectively. For the selling price of non-skimmed yoghurt are 0.66 JD/Kg, 0.70 JD/Kg, and 0.71 JD/Kg in Irbid, Jerash, and Ajloun respectively. The average quantity of regular skimmed yoghurt produced by specialized retailers in Irbid, Jerash, and Ajloun are 45 Kg/Day, 78.46 Kg/Day, and 71.11 Kg/Day respectively. For the selling price of regular skimmed yoghurt are 0.41 JD/Kg, 0.4 JD/Kg, and 0.47 JD/Kg in Irbid, Jerash, and Ajloun respectively.

Several questions were asked to the specialized retailers who produce dairy products in their shops. First, they were asked to determine the number of employees working in the shop for processing. The average number of workers is two workers in each shop, and they are local employees. All specialized retailers confirmed that they use traditional ways and simple tools in processing.

According to the specialized retailers/producers, about 71.4% of the customers in Irbid preferred dairy products produced by specialized retailers. As for Jerash and Ajloun, 71.4% and 77.8% of customers respectively, have enough trust towards the dairy products produced in the specialized retailer's shops.

Specialized retailers who purchase the dairy products and who are located in Amman and Zarqa confirmed that most the dairy products they deal with are non-skimmed yoghurt, regular skimmed yoghurt, labaneh, and white cheese.

Concerning the quantity, quality, purchasing price, and selling price of the main products are summarized in table (22). The average quantity of non-skimmed yoghurt purchased by specialized retailers in both Amman and Zarqa are 19.54 Kg/Day and 44.5 Kg/Day respectively. For the selling price of non-skimmed yoghurt it is 0.89 and 0.74 JD/Kg in Amman and Zarqa respectively. The average quantity of regular skimmed

yoghurt purchased by specialized retailers in Amman and Zarqa are 65.38 Kg/Day and 31.88 Kg/Day respectively. As for the selling price of regular skimmed yoghurt are 0.5 JD/Kg and 0.47 JD/Kg in both Amman and Zarqa respectively.

Table 22: Average Quantity, Quality, Purchasing Price, and Selling Price of Dairy Products Scale (1) Very High Quality – Scale (5) Very Low Quality

Location		Average
Amman	Quantity of Non-Skimmed Yoghurt (Kilogram)	19.54
	Quantity of Regular Skimmed Milk (Kilogram)	65.38
	Quantity of Labaneh (Kilogram)	14.54
	Quantity of Cheese (Kilogram)	15.36
	Purchasing Price for Non-Skimmed Yoghurt (JD/Kilo)	0.65
	Purchasing Price for Regular Skimmed Yoghurt (JD/Kilo)	0.4
	Purchasing Price for Labaneh (JD/Kilo)	2.3
	Purchasing Price for White Cheese (JD/Kilo)	3.33
	Quality of Non-Skimmed Yoghurt	2
	Quality of Regular Skimmed Yogurt	2
	Quality of Labaneh	2
	Quality of White Cheese	2
	Selling Price for Non-Skimmed Yoghurt (JD/Kilo)	0.89
	Selling Price for Regular Skimmed Yoghurt (JD/Kilo)	0.50
	Selling Price for Labaneh (JD/Kilo)	2.63
	Selling Price for White Cheese (JD/Kilo)	4.75
Zarqa	Quantity of Non-Skimmed Yoghurt (Kilogram)	44.50
	Quantity of Regular Skimmed Milk (Kilogram)	31.88
	Quantity of Labaneh (Kilogram)	22.00
	Quantity of Cheese (Kilogram)	10.71
	Purchasing Price for Non-Skimmed Yoghurt (JD/Kilo)	0.60
	Purchasing Price for Regular Skimmed Yoghurt (JD/Kilo)	0.35
	Purchasing Price for Labaneh (JD/Kilo)	2.30
	Purchasing Price for White Cheese (JD/Kilo)	2.35
	Quality of Non-Skimmed Yoghurt	2
	Quality of Regular Skimmed Yogurt	2
	Quality of Labaneh	2
	Quality of White Cheese	2
	Selling Price for Non-Skimmed Yoghurt (JD/Kilo)	0.74
	Selling Price for Regular Skimmed Yoghurt (JD/Kilo)	0.47
	Selling Price for Labaneh (JD/Kilo)	2.61
	Selling Price for White Cheese (JD/Kilo)	3.59

II. Marketing and Distribution

The specialized retailers were asked about the marketing costs. Figure (25) shows that Amman and Zarqa specialized retailers have the highest marketing costs (420 JD/ Month and 405 JD/Month respectively) compared with other governorates.

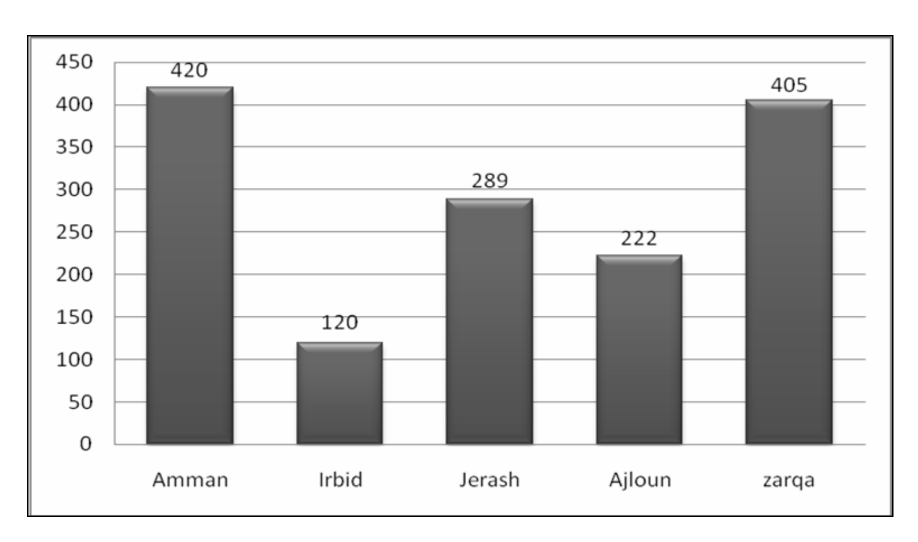


Figure 25: Marketing Cost (JD/Month)

The dairy products destinations were the final consumers and a small number to restaurants. About 96.4% of the dairy products go to the final consumer and 3.6% of the dairy products go to the restaurants.

About 98.8% of the specialized retailers don't sign contracts with buyers; they trust their customers, and most of their products are sold directly to final consumers, hence they think that there is no need for contracts.

III. Sales by Specialized Retailers

Figure (26) shows the average total sales for each specialized retailers in different governorates. Ajloun and Jerash have the highest total sales, as compared with other governorates and this shows that in Ajloun and Jerash, customers prefer to buy dairy products from specialized retailers.

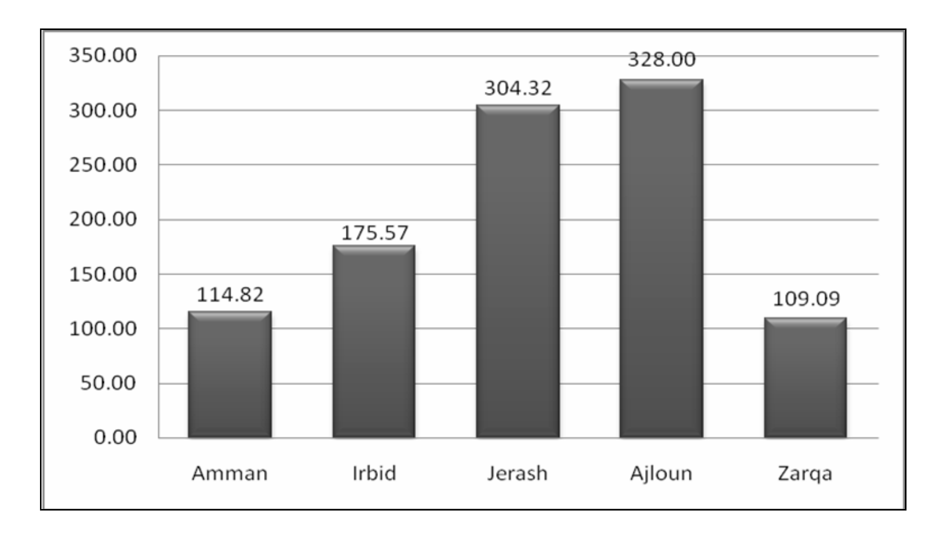


Figure 26: Average Total Sales (Kilogram/Day)

Seasons with the highest sales varies between summer and spring. However, most of the specialized retailers said the sales increases in summer more than in other seasons.

B. Non-Specialized Retailers

The non-specialized retailers said that Jordan imports some kinds of dairy products because they are not produced in Jordan or produced in small quantities. These products include powder milk, sweet cream, butter, packed cheese, canned cheese, and kashkaval cheese. As shown in table (23).

Table 23: Sources and Percentages of Dairy Products for the Non-Specialized Retailers

Dairy Products	Source of Dairy Products Dealing with		Percentage from Each Source	
	Factories	Importers	Factories	Importers
Pateurized Fresh Milk	100.00%	1.40%	99.60%	0.40%
Regular Fresh Milk	100.00%	81.40%	72.90%	27.10%
Concentrated Milk	14.30%	100.00%	4%	96%
Powder Milk	0.00%	100.00%	0%	100%
Non;Skimmed Yoghurt	100.00%	12.90%	98.90%	1.10%
Pasteurized Skimmed Yoghurt (Shanenh)	100.00%	17.10%	97.40%	2.60%
Sweet Cream (Kashta)	20.00%	100.00%	5.40%	94.60%
Buttter	2.90%	100.00%	0.70%	99.70%
Labaneh	100.00%	25.70%	95.30%	4.70%
White Cheese	100.00%	52.20%	86.50%	13.50%
Packed Cheese	22.90%	100.00%	4.70%	95.30%
Canned Cheese	50.90%	100.00%	9.10%	90.90%
Kashkaval Cheese	10.00%	90.00%	9.20%	90.80%
Yellow Cheese	95.50%	95.50%	35.30%	64.70%
Dry Yoghurt (Jameed)	100.00%	29.00%	89.50%	10.50%
Others	98.60%	89.90%	70.50%	29.50%

The grocery stores said that dairy products constitute about 8% of all stores sales. For supermarkets and minimarkets the percentages were 15% and 14% respectively, which is regarded as a good percentage and shows that customers consider dairy products as an important commodity.

4-1-5 Importers Agent

Figure (27) shows that the largest quantities of imported dairy product is the powder milk, because there is no production of such product in Jordan. The next most quantities of imported dairy product are different kinds of cheese.

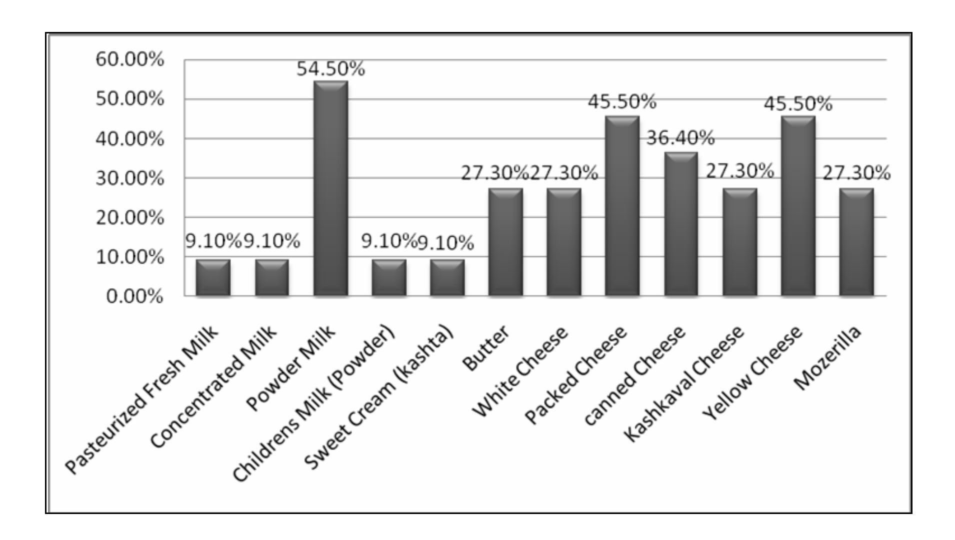


Figure 27: Imported Dairy Products

The main sources of the imported dairy products are Saudi Arabia (11%), Morocco (10%), New Zealand (8%), Belgium (8%), Egypt (8%), France (7%), Ireland (7%), UAE (6%), and Holland (5%). All of these countries are specialized in dairy cows farming and producing dairy products. About the quantity and the price of the imported dairy products, the importers refused to answer this section because it is considered as confidential information. (DOS, 2009)

A. Transportation

About 82% of the importers use refrigerated transportation facilities because dairy products need specific temperatures to increase the shelf life of these products.

For the average cost for transportation methods, the cost of the refrigerated transportation facility is 23 JD/Ton. For the regular transportation facility, the average cost is 7.5 JD/Ton. The majority of importers owned their transportation facilities.

B. Destination

Figure (28) shows that about 44.6% of the imported dairy products go to the wholesalers while 37.1% goes to the retailers.

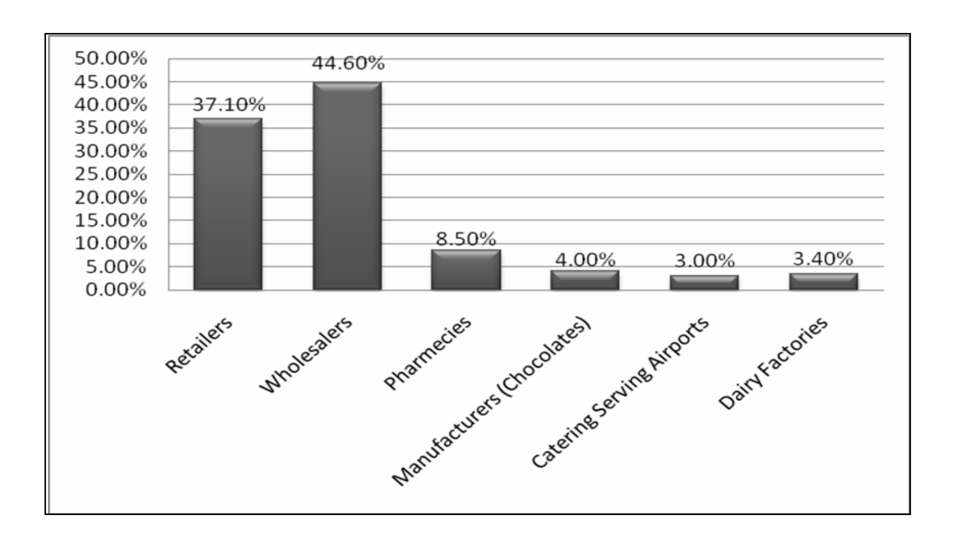


Figure 28: Average Percentages of Imported Dairy Products for Each Destination

C. Storage

All importers own storage rooms for their imported dairy products, 90.9% of them use cooled rooms for storage, and 9.1% of them use regular rooms for dairy products that don't need cooling systems.

The average cost for storing the imported dairy products was estimated at 326.7 JD/Ton/Month.

D. Contracts

Contracts signed by the importers are divided into two categories: contracts with buyers and contracts with sellers. About 34.4% of the importers confirmed that they sign contracts with buyers, and the rest of the importers imports according to the direct demand by the retailers. As for signing contracts with sellers, 54.5% of the importers signs contracts with them.

4-2 Porter's Diamond Model

From the above discussion on the agents that affect the dairy sector, the Porter's Diamond Model elements were delineated as follows:

1- Factor Conditions: The nation's position in factors of production such as skilled labor or infrastructure, necessary to compete in a given industry.

2- Demand Conditions: The nature of home-market demand for the industry's product or service.

3- Related and Supporting Industries: The presence or absence in the nation of supplier industries and other related industries that are internationally competitive.

4- Firm Strategy, Structure, and Rivalry: The conditions in how companies are created, organized, and managed, as well as the nature of domestic rivalry.

And as external elements the government and chance take place and have an effect on the nation's competitiveness.

A cluster map is designed for the dairy sector in Jordan which is shown in figure (29). The figure shows the relation between the sections in the dairy sector in Jordan, the dotted line indicates that there is a week relation between the units, as for the thick line it indicates that there is a good relation between the units. The units with the white color have a week role in the dairy sector in Jordan and need a lot improvements, for the units with the black color it support the dairy sector in Jordan and the sector is satisfied with it. As for the units with the grey color the dairy sector is moderately satisfied with it and need some improvements.

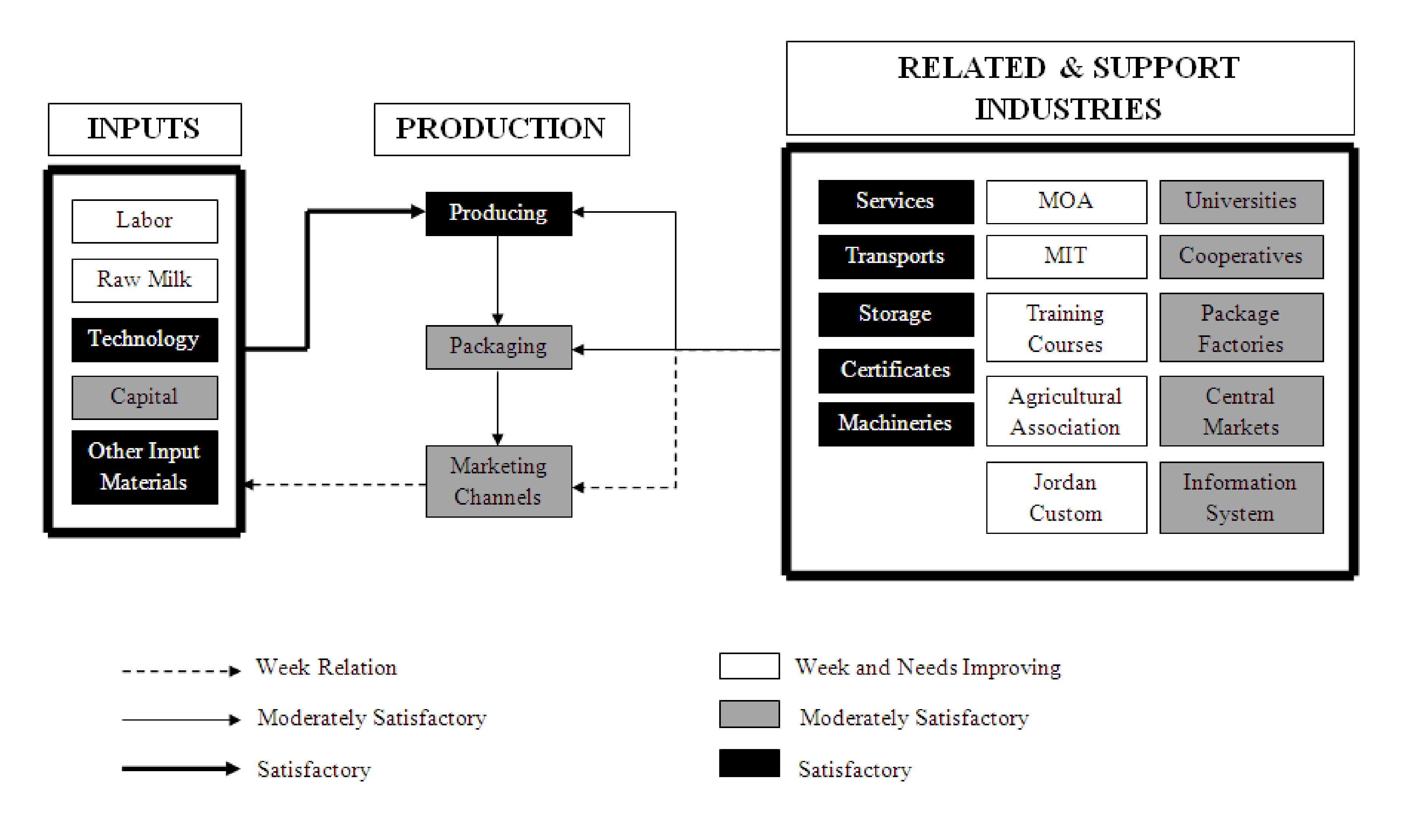
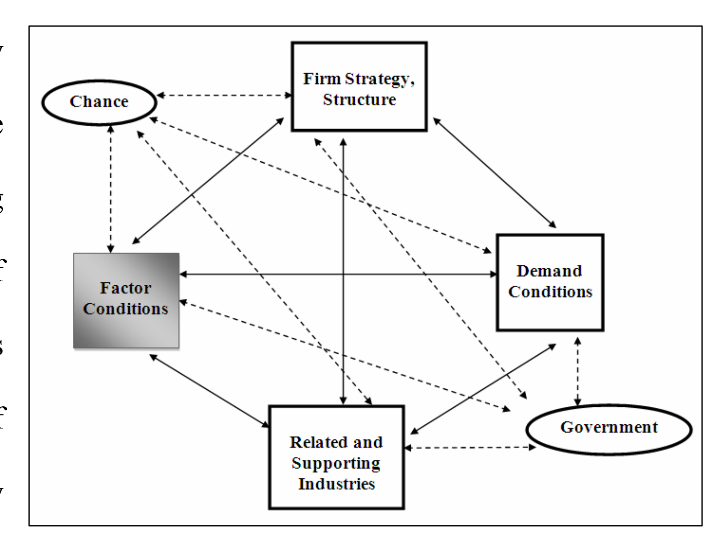


Figure 29: Jordanian Dairy Sector Cluster Map

4-2-1 Factor Conditions

The farmers supply processing plants with the most important input, i.e. the raw milk that is processed to dairy products. It was found that there was a major problem facing farmers, which is the high cost of forages. The high cost of forages will certainly affect the price of raw milk, and in return the dairy products prices will increase.



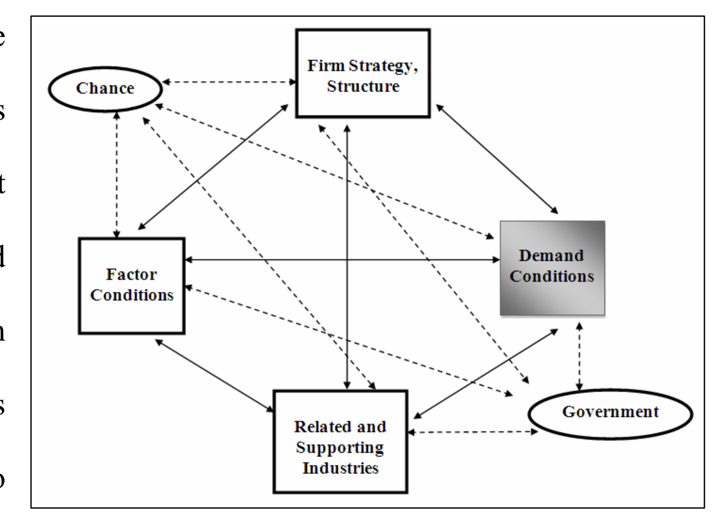
Concerning the employees who work in the dairy sector, large and medium processing plants, showed some interest with hiring educated skilled workers, but they suffer from the lack of work ethics, and this affects the efficiency of the production process in the dairy processing plants. The dairy processing plants don't implement good motivation schemes in their firms, and this reflects negatively on the workers efficiency. As for implementing training courses for the employees, the responses weren't promising. There was weak interest to recruit employees and enhance their skills.

There were few processing plants which got the ISO and HACCP certificates. Large and medium processing plants hired some specialists in their firms specialized in total quality management in order to check the quality and safety of the dairy products produced. This shows how much large and medium processing plants are ready to compete not just with local markets but also with foreign markets. As for small processing plants, they lack organization in their quality checking, which affects negatively on the dairy sector in Jordan.

R&D departments were found in large and medium processing plants. The presence of such departments helps firms and the dairy sector leverage their dairy production and produce dairy products with latest technologies. It was shown how much large and medium processing plants pay on purchasing high technological machines with high qualities in producing dairy products in their firms. That's why large and medium processing plants can produce more verities of dairy products than small processing plants do.

4-2-2 Demand Conditions

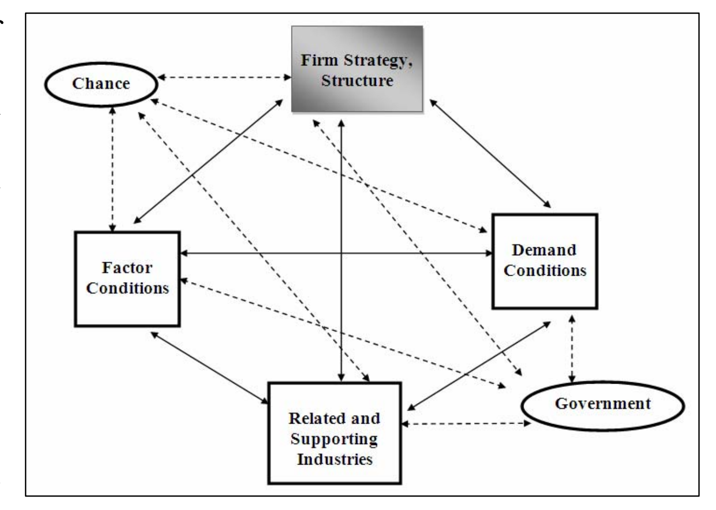
A strong local demand can create a competitive advantage against foreign countries. The demand facing the processing plants was investigated. It was found that local consumers search for good quality dairy products along with reasonable prices. This puts pressure on dairy processors to produce high quality products with reasonable prices. Consequently, R&D departments in the processing plants, which were found in the large and medium size plants in the dairy sector in Jordan, are to find new technologies and innovations to produce high quality with the lowest cost.



It was found that local consumers have good trust towards local dairy products. This gives a good sign that local processing plants can in the future compete with other countries. The majority of the processing plants believe that the demand for dairy products increase due to the population increase and health awareness.

4-2-3 Firm Strategy and Rivalry

The study showed that large and medium processing plants imply production and marketing strategies. Most of these plants have special brand names for their dairy products and work to implant their brand name in the local and foreign markets. Large and medium processing plants showed a high organization

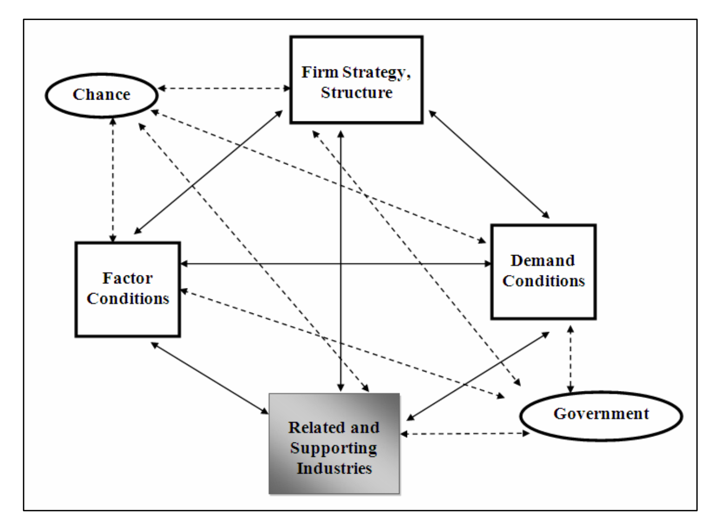


in processing activities for their products and in setting their goals. The small processing plants cannot compete with the other categories because they lack organization and do not have strategies in their firms in addition to producing lower dairy product quality. On contrary, small processing plants act as an obstacle to large and medium processing plants. They produce less cost products because they don't use high technological machines.

For the rivalry, large and medium processing plants, they suffer from small processing plants and specialized retailers who produce dairy products at their shops, and the presence of such processing plants affects negatively the development of the dairy sector in Jordan. Other major rivalries to Jordanian dairy products are some of the MENA countries, which are strong competitors to the local dairy products as they compete with producing good quality products with reasonable prices.

4-2-4 Related and Supporting Industries

The related and supporting industries are very important for the success of the dairy sector. Large and medium processing plants had no problems to access the products of these sectors and they confirmed that they have advanced facilities that help them develop and improve themselves.



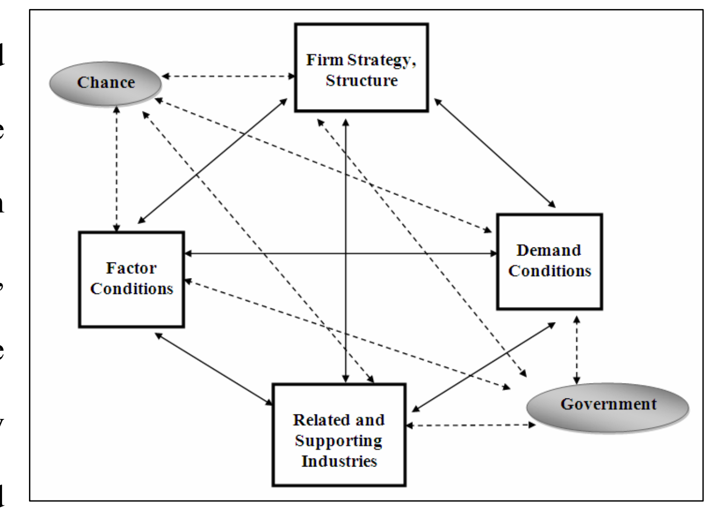
The local packaging industry is strong, especially the plastic and nylon-plastic packaging. They help the dairy sector by providing them with the necessary packaging material in quality and the desired form to their dairy products. The cardboard packaging is imported, because there is no cardboard packaging produced in Jordan due to the lower cost of the imported cardboard packaging.

In general, large and medium processing plants assured that other organizations that provide them with services such as insurance companies, advertisement, telecommunications and internet services, maintenance, research and certificates are efficient. They provide high quality services. As for the organizations that provide specialized training, they were weak in Jordan.

4-2-5 Government and Chance

The dairy processors explained that the government does not consider the dairy sector as a priority. The government should pay the dairy sector high priority because this sector has the potential to compete with the foreign market, thus, increase the export revenues. As for the regulatory environment in Jordan, the results showed that it

is moderately flexible, and the level of government assistance to the dairy sector is in the range of efficient to moderately efficient for large processing plants. For medium and small processing plants it was not efficient at all. The tax policies in Jordan have some incentives for large and medium processing plants. The tax incentives provide mostly on the starting up an investment, which shows that there are opportunities to the dairy processing sector to expand and develop. The global economic and financial crisis had negative impacts on the dairy sector and slowed down the development of the dairy sector in Jordan.



4-3 Revealed Comparative Advantage (RCA)

After determining the countries that compete with the local dairy sector, the revealed comparative advantage was evaluated. From studying the agents of the dairy sector in Jordan in the previous sections, it appeared that the main competitors to the dairy sector are the MENA countries.

The Revealed Comparative Advantage is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows.

- RCA according to Balassa can be written as:

$$RCA\ (B) = \frac{X_{ik} / X_i}{X_{wk} / X_w}$$

Where:

X_{ik}= Country i's export of goods K

X_i= Country i's exports of all goods (All Exports of Dairy Products)

X_{wk}= World exports of good k

X_w= World exports of all goods (All Exports of Dairy Products)

If:

RCA > 1, then comparative advantage revealed.

RCA < 1, then no comparative advantage revealed.

- Vollrath offered three alternative specification of RCA:

The RXA is defined as a country's export share relative to all other countries export of the specific product category. This indicator is synonym to Balassa RCA.

$$RXA = RCA\ (B)$$

The RMP is defined as a country's import share relative to all other countries imports of the specific product category.

$$RMP = \frac{M_{ik} / M_i}{M_{wk} / M_w}$$

Where, M represents the imports.

RTA index gives the difference between the RXA and RMP.

$$RTA = RXA - RMP$$

If:

RTA>0 the goods have certain competitive advantages;

RTA<0 the goods have not competitive advantages.

RCA according to Balassa and RXA according Vollrath were calculated by obtaining the total export of whole cow milk cheese and total export of dairy products

from Jordan to other countries. In addition, the total export of whole cow milk cheese and total export of dairy products from the MENA countries were collected. (Table 24)

RMP according to Vollrath were calculated by obtaining the total import of whole cow milk cheese and total imports of dairy products from Jordan and MENA countries to other countries. RTA is then obtained by calculating the difference between RXA and RMP.

Table 24: RCA According to Balassa and Vollrath for 2006,2007 and 2008[2]

Country	2006				2007				2008			
	Balassa	Vollrath			Balassa	Vollrath			Balassa	Vollrath		
	RCA	RXA	RMP	RTA	RCA	RXA	RMP	RTA	RCA	RXA	RMP	RTA
Bahrain	64.3	64.3	3.0	61.3	71.1	71.1	3.5	67.6	1.0	1.0	1.7	-0.7
Egypt	0.2	0.2	2.6	-2.4	0.6	0.6	4.9	-4.4	0.5	0.5	2.2	-1.7
Iraq	∞	∞	0.8		∞	∞	1.0		∞	∞	6.4	
Kuwait	4.5	4.5	1.7	2.8	41.1	41.1	2.1	39.0	21.9	21.9	3.7	18.2
Lebanon	0.3	0.3	0.9	-0.6	0.6	0.6	1.2	-0.6	0.4	0.4	1.1	-0.7
Libyan Arab Jamahiriya	0.2	0.2	3.4	-3.3	0.4	0.4	1.9	-1.5	0.3	0.3	2.0	-1.7
Morocco	33.4	33.4	1.9	31.5	∞	∞	2.1		134.1	134.1	2.4	131.6
Oman	∞	∞	14.3		∞	∞	12.2		108.4	108.4	2.5	105.9
Qatar	5.0	5.0	8.2	-3.2	6.0	6.0	11.0	-5.0	1.1	1.1	7.7	-6.6
Saudi Arabia	0.5	0.5	2.0	-1.5	1.4	1.4	2.8	-1.4	6.8	6.8	2.5	4.3
Syrian Arab Republic	0.4	0.4	5.2	-4.7	1.0	1.0	9.0	-0.8	1.6	1.6	18.5	-17.0
Tunisia	4.1	4.1	1.4	2.7	0.7	0.7	1.6	-0.9	0.4	0.4	1.9	-1.5
United Arab Emirates	9.6	9.6	0.7	8.9	10.0	10.0	3.5	6.4	5.3	5.3	3.8	1.4
Yemen	6.8	6.8	2.1	4.7	29.5	29.5	2.7	26.8	15.7	15.7	2.1	13.6

[2] Annex 1, 2, 3, and 4

4-3-1 RCA with Bahrain

RCAs according to Balassa with Bahrain were 64.3, 71.1 and 1 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were 61.3, 67.6 and -0.7 for 2006, 2007 and 2008 years respectively, as shown in table (24). The findings showed that Jordan had a comparative advantage against Bahrain in 2006 and 2007 in both criteria of Balassa and Vollrath. In 2008 the data shows that in Balassa criteria Jordan has a comparative advantage against Bahrain in producing whole cow milk cheese. According according to Vollrath criteria, Jordan doesn't have comparative advantage against Bahrain in 2008. This leads to a conclusion that Bahrain developed its production in this dairy product and began to compete with other countries. In general, after calculating the average of the three years, Jordan has a comparative advantage against Bahrain and can compete with its local products.

4-3-2 RCA with Egypt

RCAs according to Balassa with Egypt were 0.2, 0.6 and 0.5 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were -2.4, -4.4 and -1.7 for 2006, 2007 and 2008 years respectively, as shown in table (24). Egypt shows very high competitiveness level in all years.

4-3-3 RCA with Iraq

RCAs couldn't be calculated with Iraq because it doesn't have exports for the whole cow milk cheese. This shows that Jordan has a comparative advantage against Iraq and can compete in Iraq market.

4-3-4 RCA with Kuwait

Jordan shows a high competitive advantage in Kuwait markets. After RCAs has been calculated in both criteria, Jordan has a comparative advantage against Kuwait in 2006, 2007, and 2008. Table (24) shows the RCAs according to Balassa and Vollrath.

For Balassa the RCAs were 4.5, 41.1 and 21.9 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were 2.8, 39.0 and 18.2 for 2006, 2007 and 2008 respectively.

4-3-5 RCA with Lebanon

RCAs according to Balassa with Lebanon were 0.3, 0.6 and 0.4 for 2006, 2007 and 2008 years respectively. For Vollrath the RCAs were -0.6, -0.6 and -0.7 for 2006, 2007 and 2008 respectively, as shown in table (24). The RCAs of Balassa and Vollrath with Lebanon show that there was no comparative advantage with it in all years.

4-3-6 RCA with Libyan Arab Jamahiriya

RCAs indicator shows that Jordan has no comparative advantage against Libyan Arab Jamahiriya in both Balassa and Vollrath criteria. Jordanian exports of the whole cow milk cheese and as dairy products more than the Libyan Arab Jamahiriya exports do, because Libyan Arab Jamahiriya exports the whole cow milk cheese only.

4-3-7 RCA with Morocco

Jordan shows a high competitive advantage against Morocco. After RCA has been calculated in both criteria, Jordan has a comparative advantage against Morocco in 2006, 2007, and 2008.

4-3-8 RCA with Oman

RCA wasn't able to be calculated in 2006 and 2007 because Oman doesn't have any exports of the whole cow milk cheese in 2006 and 2007. For in 2008 Jordan has a comparative advantage against Oman. So Jordan has in general a competitive advantage in Oman's market.

4-3-9 RCA with Qatar

While the RCA was calculated with Qatar, there was a difference in the competitive advantage against Qatar in Balassa and Vollrath Criteria. In Balassa criteria, Jordan has a comparative advantage against Qatar in 2006, 2007 and 2008.

After including the imports to calculate RCA in Vollrath criteria, Jordan lost the competitive advantage against Qatar, there was no comparative advantage against Qatar in 2006, 2007 and 2008 in Vollrath criteria. Table (24) shows the RCAs according to Balassa and Vollrath, for Balassa the RCAs were 5, 6 and 1.1 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were -3.2, -5 and -6.6 for 2006, 2007 and 2008 respectively.

2-3-10 RCA with Saudi Arabia

In 2006 and 2007 Jordan has comparative advantage against Saudi Arabia according to Balassa. According to Vollrath, Jordan doesn’t have comparative advantage against Saudi Arabia. In 2008 Jordan has developed and strengthens itself in competing with Saudi Arabia. In both Balassa and Vollrath Jordan, has a comparative advantage against Saudi Arabia in 2008. Table (24) shows the RCA according to Balassa and Vollrath, for Balassa the RCAs were 0.5, 1.4 and 6.4 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were -1.5, -1.4 and 4.3 for 2006, 2007 and 2008 respectively.

2-3-11 RCA with Syrian Arab Republic

According to Balassa RCAs with Syria were 0.4, 1 and 1.6 for 2006, 2007 and 2008 respectively. For Vollrath the, RCAs were -4.7, -8 and -17 for 2006, 2007 and 2008 respectively, as shown in table (24). In 2006 Jordan didn’t have a comparative advantage against Syrian Arab Republic. As for 2007 and 2008 according to Balassa criteria Jordan, had a comparative advantage against Syria. According to Vollrath Jordan didn’t have comparative advantage against Syria since Syria is a good competitor as it is specialized in producing dairy products.

4-3-12 RCA with Tunisia

Tunisia showed a great jump in developing itself in the dairy sector. In 2006 Jordan had comparative advantage against Tunisia. As for 2007 and 2008 Tunisia developed itself as Jordan lost the comparative advantage against it. Table (24) shows the RCA according to Balassa and Vollrath. For Balassa the RCAs were 4.1, 0.7 and 0.4 for 2006, 2007 and years respectively. For Vollrath the RCAs were 2.7, -0.9 and -1.5 for 2006, 2007 and 2008 respectively.

4-3-13 RCA with UAE

RCAs according to Balassa with UAE were 9.6, 10 and 5.3 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were 8.9, 6.4 and 1.4 for 2006, 2007 and 2008 years respectively, as shown in table (24). Jordan had a comparative advantage against UAE after calculating the RCA for 2006, 2007 and 2008. Although UAE is developed in the dairy sector and considered one of the strong countries in producing dairy products, Jordan has a comparative advantage against UAE in this category of products the whole cow milk cheese.

4-3-14 RCA with Yemen

Jordan shows a high competitive advantage against Yemen. After RCA has been calculated in both criteria, Jordan has a comparative advantage against Yemen in 2006, 2007, and 2008 years. Table (24) shows the RCA according to Balassa and Vollrath. For Balassa the RCAs were 6.8, 29.5 and 15.7 for 2006, 2007 and 2008 respectively. For Vollrath the RCAs were 4.7, 26.8 and 13.6 for 2006, 2007 and 2008 respectively.

Chapter 5

Conclusion & Recommendations

5-1 Conclusions

The dairy sector is one of the oldest industries in Jordan, it witnessed a big leap in evolution, it is divided into three categories large, medium and small processing plants, the competition is fierce between the processing plants in Jordan. The large and medium processing plants have been developed by producing new kinds of dairy products with a high quality, and they see that small processing plants is slowing down the development of the sector and are considered as one of their major problems in the competition in the sector.

This study covered several agents. For each agent a questionnaire related to the dairy agribusiness sector was designed and tested to cover the competitive pattern. Also, the factors that affect this sector were tested.

The dairy cow farms are the main supplier of the most important input which is the fresh raw milk for the dairy processing plants. The production of group (A) i.e. very large farms fresh raw milk goes directly to the dairy processing plants, most of group (B) i.e. large size farms and (C) i.e. medium size farms deal with cooperatives to deliver their fresh raw milk to the dairy processing plants. Group (A) and (B) dairy cow farms showed a very high level of organization in managing their farms and in producing the fresh raw milk with the latest technologies and high quality, as for group (C) and (D) farms they lack of organization in managing their farms and producing lower fresh raw milk quality. The main problem that all dairy cow farms suffer from is the high cost of the livestock feeds which affects the fresh raw milk prices.

As for dairy processing plants, Porter’s Diamond Model factors for the dairy sector in Jordan were evaluated. Starting with the factor conditions, the results showed that large and medium processing plants have interest in hiring educated skilled workers, but they suffer from the lack of work ethics. Most of the dairy processing plants don’t

implement good motivation schemes in their firms and there was a weak interest in training the workers and enhance their skills. Large and medium processing plants hired some experts in their firms who are specialized in Total Quality Management in order to check the quality and safety of the dairy products produced, as for small processing plants, they lack organization in their quality checking. R&D departments were found in large and medium processing plants and it was shown how much large and medium processing plants pay on purchasing high technological machines with high qualities in producing dairy products in their firms.

The demand facing the processing plants was investigated. It was found that local consumers search for good quality dairy products along with reasonable prices; this puts pressure on dairy processors to find new technologies and innovations to produce high quality with the lowest cost. The majority of the processing plants believe that the demand for dairy products increase due to the population increase and health awareness.

As for the firm's strategy and rivalry factor, the study showed that large and medium processing plants imply production and marketing strategies and most of these plants have special brand names for their dairy products, the small processing plants cannot compete with the other categories because they lack organization and do not have strategies. For the rivalry, large and medium processing plants suffer from the presence of small processing plants and specialized retailers who produce dairy products at their shops, other major rivalries to Jordanian dairy products are the MENA countries, which are strong competitors to the local dairy products as they compete with producing good quality products with reasonable prices.

Large and medium processing plants had no problems to access the products of other sectors such as storage, transportation and information system, and they confirmed that they have advanced facilities. The local packaging industry is strong one, it provide

them with the necessary packaging material. In general, large and medium processing plants assured that other organizations that provide them with services such as insurance companies, advertisement, telecommunications and internet services, maintenance, research and certificates are efficient. As for the organizations that provide specialized training, they were weak in Jordan.

The dairy processors explained that the government doesn’t consider the dairy sector as a priority sector. The regulations and the government routines are the factors that affect the dairy sector negatively, it is somewhat restrictive. There are many problems facing the factories with respect to exporting dairy products, especially the large and medium since there are many restrictive regulations to export and the dairy products can’t tolerate long time because it is a perishable product.

. The global economic and financial crisis had negative impacts on the dairy sector and slowed down the development of the dairy sector in Jordan

The dairy sector shows a high potential to reach the international markets, the large and medium processing plants are producing according a high standards that make them capable to compete with the international markets. Jordan has more comparative advantage, evaluated as the level of RCA, against some MENA countries such as (Kuwait, Yemen, UAE, Morocco and Bahrain) in the whole cow milk cheese, and this indicates that dairy sector in Jordan is still developing and keeping up with the latest technologies that make it capable to compete with more than one dairy product.

5-2 Recommendations

A. The study suggests to the decision makers the following recommendations:

1. Establish a market information center that would provide up-to-date market information for the dairy processing sector, as well as addressing the export

opportunities, and enhance the role of MOA and MIT in this process and be more effective in the dairy sector.

2. Conduct continuous government inspection and self-inspection in dairy processing plants. There should be institution responsible for inspection in addition to making sure that institutions are following the regulations set by the Food and Drug Administration.
3. Focus on high-quality training and an effective system of disseminating practical advice to farmers and dairy producers.
4. There is a need for some support from the government on forages. This will lead to low cost production due to the decrease in the raw milk prices. Therefore, dairy producers will be able to produce high quality dairy products with reasonable prices.

B. As for the dairy cow farms the study suggests that they need to be more organized, especially the small farms. It is recommended to apply satellite farming for small farms. Satellite farming is a production strategy that consists of a central farm supplying the best genetics to small farms which are production centers of the final consumer product. This will take advantage of the large number of small farms and enhance the economics of scale and enforce the production with high specific qualities and that will positively affect on the dairy sector in Jordan and leverage of its competition level.

C. The study suggests to the dairy processing plants the following recommendations:

1. Concentrate the exports on countries that Jordan has a high RCA compared to competing countries. Then, step by step developing the dairy sector and starting to compete with other countries.

2. Due to the increase in competition occurring in global markets, dairy products producers have to find innovative ways to improve the effectiveness and efficiency of their supply chain. Therefore, they should exploit and rectify the linkages in the commodity chain and offer channels to maintain competitive advantage, and to enhance the role of these institutions.
3. The dairy processing plants are recommended to improve their implemented motivation and training scheme for the labors, to increase work efficiency and production.
4. The Study recommends the medium dairy processing plants to apply the satellite plants with the small plants. Through this strategy there will be a mutual benefits between both medium and small plants, by adopting this strategy the medium plants will provide administrative, technical and financial support for the small plants and produce with better efficiency and good quality, and under the name of the medium plants the marketing of the dairy products produced by the small plants will be conducted. As a result the medium plants will take advantage of the economics of scale, as for the small plants they will be able to produce good quality dairy products and can reach the international markets.

References

References

Alqaisi O, Ndambi O A and Hemme T (2009), Development of milk production and the dairy industry in Jordan. **Livestock Research for Rural Development**. 21(7), Article #107.

Batra Z. and Khan.Z (2005), Revealed Comparative Advantage: An Analysis for India and China, **Indian Council for Research on International Economic Relations**, working paper No. 168.

DOS 2009 Department of Statistics. External Trade. Annual report. Jordan.

DOS 2009 Department of Statistics. Jordan in Figures. Annual report. Jordan.

Ferto Imre and Hubbard Lionel (2002), Revealed Comparative Advantage and Competitiveness in Hungarian Agri-Food Sectors, **Institute of Economics Hungarian Academy of Sciences,** discussion papers 2002/8.

Glenn D. Israel (1992), Determining Sample Size, **Florida Cooperative Extension Service, University of Florida,** PEOD-6, November.

IMF 2010 International Monetary Inflation Rate. Annual report.

Johnson G. and Scholes K. (2011), **Exploring Cooperate Strategy: Text and Cases,** Financial Times Prentice Hall, 2011.

Karacsony, Peter (2008), Analysis of Competitiveness of Hungarian Wheat Sector with Porter's Diamond Model, **Journal of Central European Agriculture**, 9(3), 399-404.

Ministry of Planning and International Cooperation (2009), Processed Meat Sector Analysis (Competitiveness Report), **Jordanian National Competitiveness Observatory**, Amman-Jordan. (Unpublished)

Ministry of Planning and Jordan National Competitiveness Team (2000), The Agriculture Cluster in the Jordan Valley, **Jordan Competitiveness Book**, Amman-Jordan.

Ministry of Planning and Jordan National Competitiveness Team (2002), The Olive Oil Cluster, **Jordan Competitiveness Book**, Amman-Jordan.

MOA 2008 Ministry of Agriculture. Department of Dairy Production. Annual report. Jordan.

MOA 2009 Ministry of Agriculture. Department of Dairy Production. Annual report. Jordan.

Mohsen, Nabil (2001), **Dairy Industry Structure and Performance In Jordan**. Unpublished PHD. Thesis. University of Jordan, Amman. Jordan.

MOT 2004 Ministry of trade. Report on the competitiveness of the Jordanian milk and dairy products.

O'Neil. M. (2005), U.S. Environmental Protection Agency Procedure for Quality Policy, **EPA Chief Information Officer,** CIO 2106-P-01.0.

Poramacom, Nangnooch (2002), Revealed Comparative Advantage (RCA) and Constant Market Share Model (CMS) on Thai Natural Rubber, **Kasetsart Journal (Soc. Sci),** 23, 54-60.

Porter, M.E. (1985), **Competitive Advantage (Creating and sustaining superior performance)**, Free Press, New York, 1985.

Porter, M.E. (1990, 1998), **The Competitive Advantage of Nations**, Free Press, New York, 1990.

Porter, M.E. (ed.) (1986) **Competition in Global Industries**, Harvard Business School Press, Boston, 1986.

Sepp, Mati (2007), Competitiveness of Estonia Milk and Meat Sector, **Institute of Economics and Social Sciences,** March 27-28, 2007

Appendices

Annex 1- Revealed Comparative Advantage for Year 2006

		Export and Import According to FAOSTAT				Balassa	Vollrath		
Year	Country	Export of Whole Cow Milk Cheese (Tons)	Total Exports of All Dairy Products (Tons)	Import of Whole Cow Milk Cheese (Tons)	Total Imports of All Dairy Products (Tons)	RCA	RXA	RMP	RTA
2006	Jordan	3707	20821	13290	49325				
	Bahrain	23	8309	4726	52388	64.319	64.319	2.987	61.333
	Egypt	17351	19552	7387	70187	0.201	0.201	2.560	-2.359
	Iraq	0	1	20705	64995	∞	∞	0.846	
	Kuwait	234	5904	18306	115977	4.492	4.492	1.707	2.785
	Lebanon	464	907	17996	61024	0.348	0.348	0.914	-0.566
	Libyan Arab Jamahiriya	44	44	5511	70308	0.178	0.178	3.437	-3.259
	Morocco	135	25325	8533	60133	33.399	33.399	1.899	31.500
	Oman	0	37766	1887	99904	∞	∞	14.265	
	Qatar	7	197	2296	69970	5.011	5.011	8.211	-3.200
	Saudi Arabia	129546	392232	50860	386000	0.539	0.539	2.045	-1.506
	Syrian Arab Republic	25011	58543	2209	42332	0.417	0.417	5.163	-4.747
	Tunisia	29	660	2915	14963	4.052	4.052	1.383	2.669
	United Arab Emirates	748	40409	108780	282871	9.618	9.618	0.701	8.918
	Yemen	343	13081	11228	86929	6.790	6.790	2.086	4.704

Annex 2- Revealed Comparative Advantage for Year 2007

		Export and Import According to FAOSTAT				Balassa	Vollrath		
Year	**Country**	**Export of Whole Cow Milk Cheese (Tons)**	**Total Exports of All Dairy Products (Tons)**	**Import of Whole Cow Milk Cheese (Tons)**	**Total Imports of All Dairy Products (Tons)**	**RCA**	**RXA**	**RMP**	**RTA**
2007	Jordan	3842	9527	15934	46408				
	Bahrain	48	8457	4829	48634	71.052	71.052	3.458	67.594
	Egypt	19083	28038	5974	86051	0.593	0.593	4.946	-4.353
	Iraq	0	1	12910	38911	∞	∞	1.035	
	Kuwait	79	8055	21062	128263	41.119	41.119	2.091	39.028
	Lebanon	779	1189	18127	63805	0.616	0.616	1.209	-0.593
	Libyan Arab Jamahiriya	44	44	18300	101486	0.403	0.403	1.904	-1.501
	Morocco	0	22687	10105	62594	∞	∞	2.127	
	Oman	0	45314	3247	115717	∞	∞	12.236	
	Qatar	15	222	2278	72657	5.968	5.968	10.951	-4.983
	Saudi Arabia	128494	443247	50869	407925	1.391	1.391	2.753	-1.362
	Syrian Arab Republic	25552	63497	1940	50757	1.002	1.002	8.983	-7.981
	Tunisia	12512	20831	3334	15477	0.671	0.671	1.594	-0.922
	United Arab Emirates	1810	44687	27646	283853	9.956	9.956	3.525	6.431
	Yemen	229	16729	12295	96036	29.460	29.460	2.682	26.778

Annex 3- Revealed Comparative Advantage for Year 2008

		Export and Import According to FAOSTAT				Balassa	Vollrath		
Year	**Country**	**Export of Whole Cow Milk Cheese (Tons)**	**Total Exports of All Dairy Products (Tons)**	**Import of Whole Cow Milk Cheese (Tons)**	**Total Imports of All Dairy Products (Tons)**	**RCA**	**RXA**	**RMP**	**RTA**
2008	Jordan	5636	21579	17844	56447				
	Bahrain	2459	9457	8751	46378	1.004	1.004	1.675	-0.671
	Egypt	25946	44819	19586	135825	0.451	0.451	2.192	-1.741
	Iraq	0	1	5146	103929	∞	∞	6.384	
	Kuwait	80	6694	8126	93918	21.854	21.854	3.654	18.201
	Lebanon	693	1111	15773	53725	0.419	0.419	1.077	-0.658
	Libyan Arab Jamahiriya	45	45	14179	89353	0.261	0.261	1.992	-1.731
	Morocco	34	17456	9537	73834	134.093	134.093	2.447	131.645
	Oman	192	79716	19651	155861	108.439	108.439	2.507	105.931
	Qatar	25	105	3704	90508	1.097	1.097	7.724	-6.627
	Saudi Arabia	10717	279968	37643	296407	6.823	6.823	2.489	4.334
	Syrian Arab Republic	5461	32445	731	42872	1.552	1.552	18.540	-16.988
	Tunisia	8297	11717	4061	24082	0.369	0.369	1.875	-1.506
	United Arab Emirates	2185	44058	27717	334866	5.266	5.266	3.819	1.447
	Yemen	323	19435	11588	76969	15.715	15.715	2.100	13.616

Annex 4- Revealed Comparative Advantage Average of 2006, 2007 and 2008 Years

		Export and Import According to FAOSTAT				Balassa	Vollrath		
Year	**Country**	**Export of Whole Cow Milk Cheese (Tons)**	**Total Exports of All Dairy Products (Tons)**	**Import of Whole Cow Milk Cheese (Tons)**	**Total Imports of All Dairy Products (Tons)**	**RCA**	**RXA**	**RMP**	**RTA**
Average	Jordan	4395.00	17309.00	15689.33	50726.67				
	Bahrain	843.33	8741.00	6102.00	49133.33	2.632	2.632	2.490	0.141
	Egypt	20793.33	30803.00	10982.33	97354.33	0.376	0.376	2.742	-2.366
	Iraq	0.00	1.00	12920.33	69278.33	∞	∞	1.658	
	Kuwait	131.00	6884.33	15831.33	112719.33	13.344	13.344	2.202	11.142
	Lebanon	645.33	1069.00	17298.67	59518.00	0.421	0.421	1.064	-0.644
	Libyan Arab Jamahiriya	44.33	44.33	12663.33	87049.00	0.254	0.254	2.126	-1.872
	Morocco	56.33	21822.67	9391.67	65520.33	98.362	98.362	2.158	96.205
	Oman	64.00	54265.33	8261.67	123827.33	215.293	215.293	4.636	210.657
	Qatar	15.67	174.67	2759.33	77711.67	2.831	2.831	8.711	-5.880
	Saudi Arabia	89585.67	371815.67	46457.33	363444.00	1.054	1.054	2.420	-1.366
	Syrian Arab Republic	18674.67	51495.00	1626.67	45320.33	0.700	0.700	8.617	-7.917
	Tunisia	6946.00	11069.33	3436.67	18174.00	0.405	0.405	1.636	-1.231
	United Arab Emirates	1581.00	43051.33	54714.33	300530.00	6.914	6.914	1.699	5.215
	Yemen	298.33	16415.00	11703.67	86644.67	13.971	13.971	2.290	11.681

Annex 5- Dairy Cow Farms Questionnaire

*** INPUTS:**

-LIVESTOCKS

1. Number of Cows and Bull

	Local	Imported
No. of Cows		
No. of Bulls		

2. Method of Insemination??

◯ Natural ◯ Artificial

3. The Productive Life for the Cow:

…………………………….

-LIVESTOCKS FEED

4. Type of Feeds:

4. A. Quantity of Concentrates

…………………………….

4. B. Quantity of Roughages

…………………………….

-VACCINES & MEDICINS

5. Do you employ a Full Time Vet in the Farm?

◯ YES ◯ NO, If NO, How Many Times he Visits the Farm?

6. Schedule of Vaccination (Season Vaccines):

7. Do these Drugs have an Impact on the Quantity and Quality of the Milk:

◯ YES ◯ NO, If Yes, What are the Impacts?

-LABORS

8. Number of Employees?

	Skilled Labor	**Un-Skilled Labor**
No. of Employees		

-MACHINES & TOOLS

9. Mechanism of Milking:

◯ Manual (By Hand) ◯ Automatic

10. Source of Milking machines:

◯Local ◯ Imported

11. Capacity of the Milking Machines:

………………………………….

12. How Many Times do you conduct maintenance Maintain the Milking machines Per Year:

◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6
◯ 7
◯ More than seven

13. The Useful Life of the Milking machines:

………………………………….

14. Do you Use the Latest Technology for Milking machines:

◯ YES ◯ NO, If NO, WHY?

-BUILDINGS

15. Type of Building Used to the Cows:

◯ Barns ◯ Yards

16.

	A. Capacity (No. of Cows or Calves)	B. Area (m^2)	C. Material Used
Barns			
Yards			

- STORAGE

17. Do you Store your Produce:

◯ YES ◯ NO

IF YES,

18. Type of Store:

19. Period of Storing:

………………………………….

20. Loss and Waste During Storage:

………………………………….

*** PRODUCTION**

21. Average Daily Milk Production

………………………………….

22. Average Daily Milk Production Depending on the Season

◯ Summer: ………………………..
◯ Winter: ………………………….
◯ Spring: …………………………….
◯ Fall: ……………………………….

23. Times of Milking Per Day:

◯ 1 ◯ 2
◯ 3 ◯ 4
◯ More than Four

24. Times of Milking:

◯ Morning
◯ Noon
◯ After Noon
◯ Night

<u>* PROCESSING</u>

25. Do you Process Dairy Products in the Farm?

◯ YES ◯ NO, If YES,

26. What Kind of Dairy Products You Produce?

27. What Machines do you Use?

28. What Kind of Packaging do you Use?

29. Farm Gate Prices:

Type of Production	Prices (JD/Kg)
Crude Milk	
Dairy Products:	

*** DISTRIBUTION**

30. Milk Destination:
◯ Dairy Factories…………………%
◯ Cooperatives……………………%
◯ Final Consumer………………….%
◯ Other (Specify)…………………….%

31. Dairy Products Destination:
◯ Retailers…………………………..%
◯ Cooperatives…………………………%
◯ Final Consumer……………………………..%
◯ Other (Specify)…………………………………….%

-TRANSPORTATION

32. Do you Own Transportation in the Farm?
◯ YES ◯ NO

If YES,

33. Type of Transportation Facility:

34. Waste and Loss for Each Type of Transportation:

-CONTRACTS

35. Do you Sign Contracts with the Buyers?
◯ YES ◯ NO

If YES,

36. With whom do you Sign Contracts?
◯ Dairy Factories
◯ Cooperatives
◯ Other (Specify)

37. Validity of the Contract (in Years):
◯ 1 ◯ 2
◯ 3 ◯ 4
◯ More than Four……………….

38. Quantity that Should Be Delivered:

………………………………….

39. What is the Period between Each Delivery?

………………………………….

40. Specification and Standards of the Milk:

41. Do you Sign Contracts with the Sellers?
◯ YES ◯ NO

If YES,

42. With whom do you Sign Contracts?
◯ Forage Sellers
◯ Cows Sellers
◯ Other (Specify)

43. Validity of the Contract (in Years):
◯ 1 ◯ 2
◯ 3 ◯ 4
◯ More than Four…………………

44. Quantity Delivered:

………………………………….

45. What is the Period between Each Delivery?

………………………………….

*** COST**

46. Operational Cost per Month:

Items	Cost (JD)
Feeds	
Labor	
Transportation (per Ton)	
Maintenance	
Vaccines and Therapies	
Dairy Products Packaging:	
Water	
Electricity	

47. Investment Costs:

Items	Cost (JD)	Useful Life (Years)
Cow: Local Imported		
Barns		
Milking Machines		
Stores		
Transports		
Dairy Processing Machines:		
Land		
Cooling Tanks		
Forages Machines		

Annex 6- Dairy Factories Questionnaire

1. **Mark commodities you produce:**

◯ Pasteurized Fresh Milk
◯ Regular Fresh Milk
◯ Concentrated Milk
◯ Powder Milk
◯ Children's Milk (Powder)
◯ Non-Skimmed Yoghurt
◯ Pasteurized Skimmed Yoghurt (Shanenah)
◯ Sweet Cream (Kashta)
◯ Butter
◯ Regular Skimmed Yoghurt
◯ Labaneh
◯ White Cheese
◯ Packed Cheese
◯ Canned Cheese
◯ Kashkaval Cheese
◯ Yellow Cheese
◯ Dry Yoghurt (Jameed)
◯ Others (Specify)

2. **For each of the factors of doing business below, characterize the impact on the Dairy Agribusiness sector in Jordan:**
   A. Access to financing: ◯ not an issue …◯ extremely problematic
   B. Illegal Competition: ◯ not an issue …◯ extremely problematic
   C. Foreign currency regulations: ◯ not an issue … ◯ extremely problematic
   D. Government instability: ◯ not an issue … ◯ extremely problematic
   E. Level of educated workforce: ◯ not an issue … ◯ extremely problematic
   F. Inadequate supply of infrastructure: ◯ not an issue … ◯ extremely problematic
   G. Inefficient government bureaucracy: ◯ not an issue … ◯ extremely problematic
   H. Inflation: ◯ not an issue … ◯ extremely problematic
   I. Policy instability: ◯ not an issue … ◯ extremely problematic
   J. Poor work ethic in national labor force: ◯ not an issue … ◯ extremely problematic
   K. Restrictive labor regulations: ◯ not an issue … ◯ extremely problematic
   L. Tax rates: ◯ not an issue … ◯ extremely problematic
   M. Tax regulations: ◯ not an issue … ◯ extremely problematic

3. **List 3 major problems that your company faces at the moment (open question):**

   1………………………………………

   2……………………………………..

   3……………………………………..

*** FACTOR CONDITION**

4. Please indicate your company's location of operations:

◯ Only in Jordan
◯ Jordan and region countries
◯ Jordan and worldwide

5. Describe the source of raw Milk used in your factory:

◯ Fresh Local Milk
◯ Chilled imported Fresh Milk
◯ Imported Powder Milk
◯ Others (Specify)

6. From which country do you get the raw Milk used in your factory

◯ Middle East Countries
◯ Asia
◯ Europe
◯ Australia
◯ Africa
◯ North America
◯ South America

Specify the countries for each continent

7. Employees

	Total Number	% local employees in your factories	% of female workers in your factories	Skilled Labor		
				Scientists	Engineers	Technicians
No. of Employees						

8. How many training courses to your employees are held annually for your employees?

◯ None
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ More than five

9. On average, how much per year do you spend on training per employee?

◯ Nothing
◯ 100 JD
◯ 101 – 300 JD
◯ More than 300 JD

10. How much do you spend for research and development annually?

- ◯ Nothing
- ◯ less than JD 1000
- ◯ JD1000-3000
- ◯ JD 3001-5000
- ◯ JD 5001-10000
- ◯ JD 10001-20000
- ◯ More than JD 20000

11. How do you assess current policies applied by the banking sector in Jordan (you may choose more than one answer)

- ◯ Current banking regulations harm my business
- ◯ Current banking policies are the same as usually (nothing changed lately)
- ◯ Current banking policies help my business grow
- ◯ Current banking policies are too restrictive, and should be changed in order for my business to grow.
- ◯ Current banking policies create liquidity problems for my business.
- ◯ Current banking policies deteriorate my competitive position.
- ◯ Current banking policies help to strengthen my competitive position.

12. Do you have ISO certificate?

- ◯ Yes
- ◯ No
- ◯ I plan to get in the nearest future
- ◯ No need

13. Do you have HACCP certificate?

- ◯ Yes
- ◯ No
- ◯ I plan to get in the nearest future
- ◯ No need

14. Machineries:

Machine Type	Cost	Useful Life

15. Please indicate what motivation scheme have been implemented in your factories

- ◯ None
- ◯ Bonus
- ◯ “career path”
- ◯ Other – if so, what? (Open question)

16. What is the quality of machineries you use in the production process? (scale 1 – 5: 1- very high quality, 5 – very low quality)

Machine Type	Quality (1-5)

17. Who and how often do you check the quality of your products? (Open question)………

18. What is the % of material you import for production (vs. material that you can purchase locally in Jordan)

……………………….

19. Do you have your own R&D laboratory in the company?

◯ Yes
◯ No

20. How would you describe quality of Milk you receive for processing?

◯ Highest Possible Quality
◯ Average Quality
◯ I never Check the quality of Milk
◯ I buy the cheapest possible Milk

<u>* DEMAND CONDITIONS</u>

21. What is the destination of your products (in %)

◯ Local market (Jordan)……………%
◯ Regional market (MENA countries)…………….%
◯ EU countries……………%
◯ US market…………….%
◯ Other destinations…………….%

22. Local Destination:

◯ Specialized Retailers…………..%
◯ Non-Specialized Retailers……………%
◯ Final Consumer…………..%
◯ Exporters……………%
◯ Other destinations……………%

23. In your opinion what is the key factor affects purchasing your products by customers (you can choose more than one)?

◯ Price
◯ Quality
◯ Quality and price equally
◯ Good brand
◯ Other (what?)…..

24. How do you predict – the demand for Dairy Products in the nearest future will:

◯ Increase somewhat why?
◯ Increase significantly why?
◯ Remain the same why?
◯ Decrease why?
◯ Decrease significantly why?

25. How often are your customers surveyed on the quality of your products: (choose one)

◯ Once per year
◯ Twice per year
◯ three time per year
◯ More than three time
◯ Does not exist

26. Do you think local customers in Jordan trust the quality of Dairy Products sold in Jordan by Dairy Agribusiness sector?

① ② ③ ④ ⑤

(Scale 1-5: 1 – yes very much, 5 – they don't trust it at all)

<u>* FIRM STRATEGY AND RIVALRY</u>

27. Do you have a formal overall strategy?

◯ Yes ◯No, If YES

28. Do you have a marketing strategy?

◯ Yes ◯No, If YES

29. Do you have brand names for your products?
◯ Yes ◯No

If yes list them:

30. How much is your local market share in terms of Dairy products?

	Less than 5%	**5%-10%**	**11%-20%**	**21%-30%**	**31%-40%**	**41%-50%**	**More than 50%**
Pasteurized Fresh Milk							
Regular Fresh Milk							
Concentrated Milk							
Powder Milk							
Children's Milk (Powder)							
Non-Skimmed Yoghurt							
Pasteurized Skimmed Yoghurt (Shanenah)							
Sweet Cream (Kashta)							
Butter							
Regular Skimmed Yoghurt							
Labaneh							
White Cheese							
Packed Cheese							
Canned Cheese							
Kashkaval Cheese							
Yellow Cheese							
Dry Yoghurt (Jameed)							
Others (Specify)							

31. Competition among institutions in the Dairy Agribusiness sector in Jordan can best be characterized by which of the following statements: (choose only one)

◯ Many companies setting their own price and competing on who has the lowest price in the market
◯ Mostly companies charging the lowest price that compete on price with only a few institutions able to charge a premium price for a specialized product
◯ A group of institutions that compete on both price, specialization and quality
◯ Mostly high-priced institutions, with a few new companies that are putting pressure to lower the price

32. Competition among Dairy companies in Jordan is driven by:

◯ Quality
◯ Price
◯ Both quality and price
◯ Other (what?)……

33. Competition for your products mainly come from:

◯ Jordan
◯ MENA countries
◯ The US
◯ The EU
◯ South America
◯ Asia
◯ Australia
◯ Other (what?)

<u>* RELATED AND SUPPORTING INDUSTRIES</u>

34. Do you have access to adequate storage facilities?

◯ Yes ◯No

If YES,

Type of Store	Cost	Useful Life

35. Do you have access to adequate transportation facilities?

◯ Yes ◯No

36. Do you have access to adequate information system?

◯ Yes ◯No

37. Are the supplied raw materials available on time?

◯ Yes ◯No

38. Type of Packaging:
(Scale 1 – 5: 1- very high quality, 5 – very low quality)

	Type of Package	Source	Cost	Quality (1-5)
Pasteurized Fresh Milk				
Regular Fresh Milk				
Concentrated Milk				
Powder Milk				
Children's Milk (Powder)				
Non-Skimmed Yoghurt				
Pasteurized Skimmed Yoghurt (Shanenah)				
Sweet Cream (Kashta)				
Butter				
Regular Skimmed Yoghurt				
Labaneh				
White Cheese				
Packed Cheese				
Canned Cheese				
Kashkaval Cheese				
Yellow Cheese				
Dry Yoghurt (Jameed)				
Others (Specify)				

39. Organizations that provide :

	Exists in Jordan and provide high quality services	**Exists in Jordan and provide low quality services**	**Do not Exist in Jordan**
Services			
Third party standards and certification			
Specialized training			
Research			

<u>* GOVERNMENT/CHANCE</u>

40. Describe the regulatory environment in Jordan

◯ Very flexible
◯ Flexible
◯ Medium flexibility
◯ Low flexibility
◯ the most restrictive

41. Evaluate the Tax Policy (tax incentives if any)
- ◯ There is a lot of tax incentives
- ◯ There is some tax incentives
- ◯ There is no tax incentives

42. Tax incentives exists for (check all that apply)
- ◯ Employment level
- ◯ Investment
- ◯ Research and development
- ◯ Start-Up
- ◯ Environmental Management

43. Evaluate the efficiency of the government in assisting the Dairy Agribusiness sector in Jordan
- ◯ Very Efficient
- ◯ Efficient
- ◯ Medium Efficiency
- ◯ Low efficiency
- ◯ Not efficient

44. Evaluate the interest rate level
- ◯ Very Efficient
- ◯ Efficient
- ◯ Medium Efficiency
- ◯ Low efficiency
- ◯ not efficient

45. The Government sees Dairy Agribusiness as
- ◯ A priority
- ◯ medium importance
- ◯ Low importance
- ◯ Not importance

46. The Taxes for food processing sector in Jordan are
- ◯ Unreasonable high and suffocating the system
- ◯ High than other sectors but justified
- ◯ In line with other sectors
- ◯ Slightly lower than other sectors
- ◯ Much lower than other sectors

47. How is present global economic and financial crisis affect your operations
- ◯ Does not affect at all
- ◯ Affects positively
- ◯ Affects negatively

<u>* Export Related Information</u>

48. Do you have interest to Export you Dairy Products?

◯Yes ◯No

49. What are the problems facing the Jordanian Dairy Product exports?

50. Are there studies or surveys for the potential foreign markets?

◯ Yes ◯No

51. What are the fields of studies and surveys needed in the foreign countries?

52. What do you suggest for enhancing exports of Dairy Products?

Annex 7- Importers Questionnaire

1. What Do You Import?

- ◯ Dairy Products
- ◯ Vegetables and Fruits
- ◯ Frozen Foods
- ◯ Oils
- ◯ Meat and Poultry
- ◯ Others (Specify)

2. What Dairy Product do you Import?

(Scale 1 – 5: 1- very high quality, 5 – very low quality)

	Source	**Quantity**	**Price**	**Quality (1-5)**	**Import Highest Month**
Pasteurized Fresh Milk					
Regular Fresh Milk					
Concentrated Milk					
Powder Milk					
Children's Milk (Powder)					
Non-Skimmed Yoghurt					
Pasteurized Skimmed Yoghurt (Shanenah)					
Sweet Cream (Kashta)					
Butter					
Regular Skimmed Yoghurt					
Labaneh					
White Cheese					
Packed Cheese					
Canned Cheese					
Kashkaval Cheese					
Yellow Cheese					
Dry Yoghurt (Jameed)					
Others (Specify)					

- TRANSPORTATION

3. Dairy Products Destination:

- ◯ Dairy Factories................. %
- ◯ Retailers................. %
- ◯ Final Consumer................. %
- ◯ Othe (Specify) .... %

4. Type and Capacity of Transportation Facility

5. Owner of the Transportation Facility:

…………………………….

6. Cost per Ton of Transportation to Different Outlets:

…………………………….

- STORAGE

7. Do you Store your Products:
◯ YES ◯ NO

IF YES,

7. Who Own the Store?
◯ Dairy Factories
◯ Retailers
◯ Final Consumer
◯ Other (Specify)

8. Type of store:

9. Period of storing:

………………………………….

10. Cost for Storage (per Month per Ton):

………………………………….

-CONTRACTS

12. Do you Sign Contracts with the Buyers?
◯ YES ◯ NO

If YES,

13. With whom do you Sign Contracts?
◯ Dairy Factories
◯ Retailers
◯ Other (Specify)

14. Contract Condition:

………………………………….

15. Validity of the Contract (in years):

◯ 1 ◯ 2
◯ 3 ◯ 4
◯ More than Four…………………

16. Quantity Delivered:

………………………………….

17. What is the Period between Each Delivery?

………………………………….

18. Specification and Standards of the dairy product:

19. Do you Sign Contracts with the Sellers?

◯ YES ◯ NO

If YES,

20. With whom do you Sign Contracts?

21. Contract conditions:

………………………………….

22. Validity of the Contract (in Years):

◯ 1 ◯ 2
◯ 3 ◯ 4
◯ More than Four…………………

23. Quantity Delivered:

………………………………….

24. What is the Period between Each Delivery?

………………………………….

Annex 8- Specialized Retailers Questionnaire

-Milk for Processing:
(Scale 1 – 5: 1- very high quality, 5 – very low quality)

1. Source (%)			**2. Quantity**	**3. Buying Price**	**4. Quality (1-5)**
Factories	Importers	Farmers			

5. Please indicate your company's location of operations:

◯ In all the Country
◯ In the Same Governor
◯ More than one Governor,………………

6. Employees

	Total Number	**% local employees in your factories**	**Salary**
No. of Employees			

- Annual Quantity Produced/Purchased, Selling Prices:

Product	7. Daily Quantity Produced/Purchased	8. Purchasing Price of the Dairy Products	9. Quality of Purchased Dairy Products	10. Selling Prices (JD/Kg))
Pasteurized Fresh Milk				
Regular Fresh Milk				
Concentrated Milk				
Powder Milk				
Children's Milk (Powder)				
Non-Skimmed Yoghurt				
Pasteurized Skimmed Yoghurt (Shanenah)				
Sweet Cream (Kashta)				
Butter				
Regular Skimmed Yoghurt				
Labaneh				
White Cheese				
Packed Cheese				
Canned Cheese				
Kashkaval Cheese				
Yellow Cheese				
Dry Yoghurt (Jameed)				
Others (Specify)				

11. Method of Processing:

………………………………

12. Machineries:
(Scale 1 – 5: 1- very high quality, 5 – very low quality)

Machine Type	Cost	Useful Life	Quality(1-5)

13. In your opinion what is the key factor affects purchasing your products by customers (you can choose more than one)?
◯ Price
◯ Quality
◯ Quality and price equally
◯ Good brand
◯ Other (what?)…..

14. Do you think local customers in Jordan trust the quality of Dairy Products sold in Jordan by Dairy Agribusiness sector?

① ② ③ ④ ⑤

(Scale 1-5: 1 – yes very much, 5 – they don't trust it at all)

- MARKETING & DISTRIBUTION

15. Owner of the Transportation	16. Marketing Cost			17. Dairy Products Destination (%)			
	A. Transportation	B. Storage	C. Others (Specify)	Final Consumer	Hotels	Restaurants	Others (Specify)

- CONTRACT

18. Do you Sign Contracts with the Buyers?

◯ YES ◯ NO

If YES,

19. With whom do you Sign Contracts?

◯ Dairy Factories
◯ Retailers
◯ Final Consumer
◯ Hotel
◯ Restaurant
◯ Others (Specify)

20. Contract Condition:

…………………………………

21. Validity of the Contract (in years):

◯ 1 ◯ 2
◯ 3 ◯ 4
◯ More than Four…………………

22. Quantity Delivered:

…………………………………

23. What is the Period between Each Delivery?

…………………………………

24. Specification and Standards of the Dairy:

- SALES

25. Total Sales

…………………………………

26. Season with the Highest Sales

…………………………………

27. Other Factors that Affect the Sales

Annex 9- Non-Specialized Retailers Questionnaire

1. Kind of Dairy Products you Deal with	**2. Source %**			
	Factories	Importers	Specialized Retailers	Others (Specify)
Pasteurized Fresh Milk				
Regular Fresh Milk				
Concentrated Milk				
Powder Milk				
Children's Milk (Powder)				
Non-Skimmed Yoghurt				
Pasteurized Skimmed Yoghurt (Shanenah)				
Sweet Cream (Kashta)				
Butter				
Regular Skimmed Yoghurt				
Labaneh				
White Cheese				
Packed Cheese				
Canned Cheese				
Kashkaval Cheese				
Yellow Cheese				
Dry Yoghurt (Jameed)				
Others (Specify)				

- SALES

6. Total Sales of Dairy Products

…………………………………

7. % of Dairy Products Sales to all Sales

…………………………………

تقييم التنافسية لقطاع الألبان في الأردن

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الملخص

تركز هذه الدراسة على تقييم تنافسية قطاع الألبان في الأردن من خلال الأهداف التالية: و هي إظهار وضع عمليات الإنتاج والتنافسية في قطاع الالبان التي تعتبر من أهم الصناعات الغذائية في الأردن، بالاضافة الى التعرف الى العوامل الرئيسية التي تؤثر على قطاع الالبان بشكل عام، دراسة قدرة منتجات القطاع الى الوصول للاسواق العالمية، و تحديد اولويات المنشآت و حاجاتها الى الدعم، لتحقيق هذه الاهداف تم استخدام نموذج بورتر لدارسة التنافسية في قطاع الالبان بالأردن، بالاضافة الى مؤشر الـ(RCA)، الذي يقيس الميزة النسبية في دول الشرق الأوسط و شمال افريقيا، وتم حساب الـ(RCA) لفئة الجبنة المصنوعة من حليب الابقار كامل الدسم.

أظهرت نتائج هذه الدراسة أن إنتاج الاجبان من حليب الابقار كامل الدسم في الأردن لديه ميزة نسبية وميزة تنافسية جيدة امام بعض دول الشرق الأوسط و شمال افريقيا مثل الكويت و المغرب و اليمن و الإمارات العربية المتحدة، و لكن لم تظهر ميزة نسبية ضد مصر و لبنان. كما أظهر نموذج بورتر امكانيات المصانع الكبيرة والمتوسطة في منافسة الأسواق العالمية على الرغم من وجود بعض المشاكل في المدخلات، و بعض الاجراءات الحكومية الروتينية وقوانين التصدير التي تشكل حاجز أمام عملية التنافس.

أوصت الدراسة تشجيع الحكومة على إقامة مركز نظام للمعلومات، والتركيز على توفير تدريب ذو جودة عالية و تقديم النصائح العملية للمزارعين ومنتجي الألبان، وتقديم بعض الدعم للأعلاف. كذلك أوصت الدراسة مصانع الألبان التركيز على التصديرللبلدان التي لديها ميزة تنافسية عالية مقارنة بالدول المنافسة، وأوصت المصانع متوسطة الحجم تطبيق استراتيجية اقتصاديات الحجوم لتشمل منتجات مصانع الألبان الصغيرة في أنشطتها.